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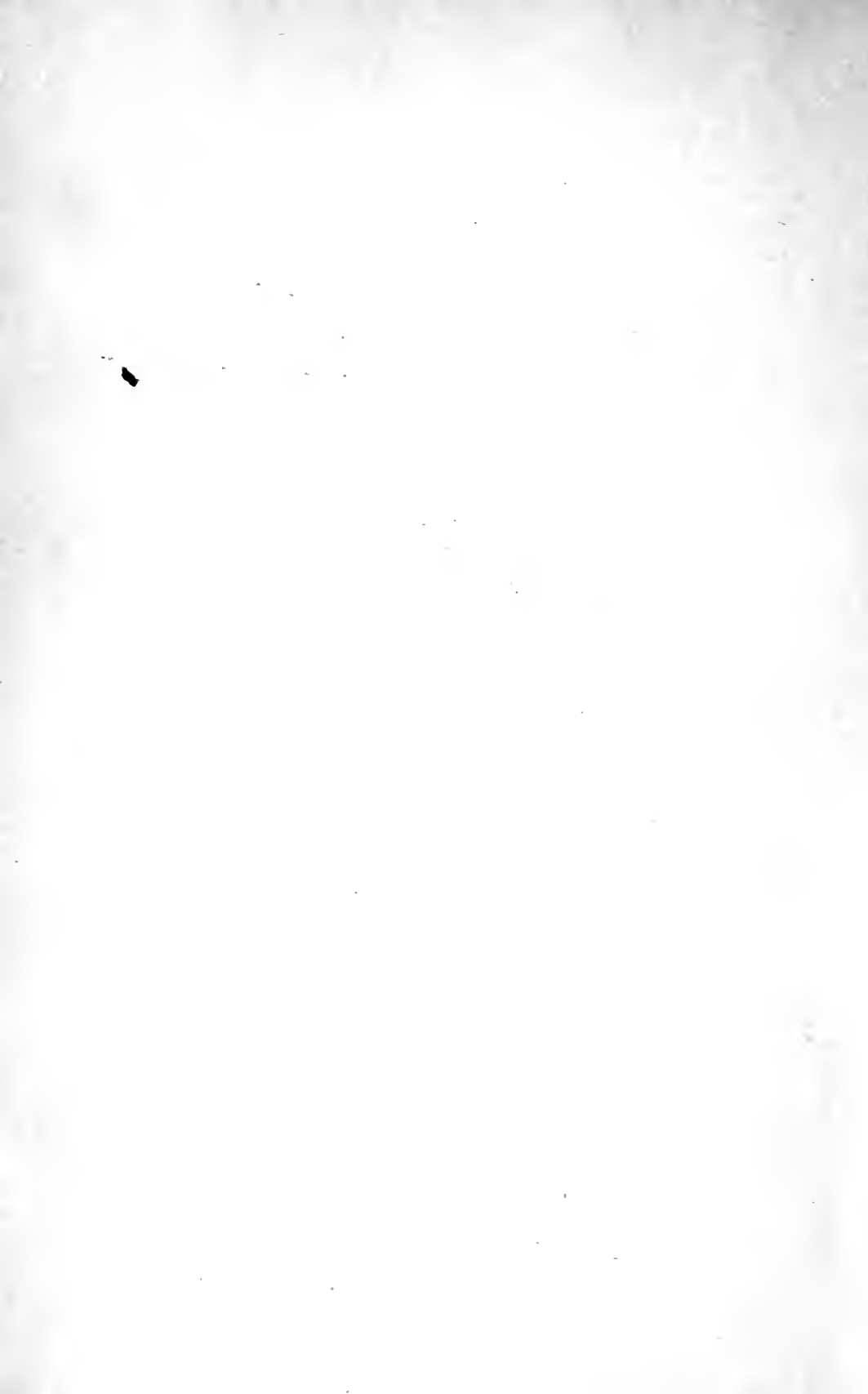
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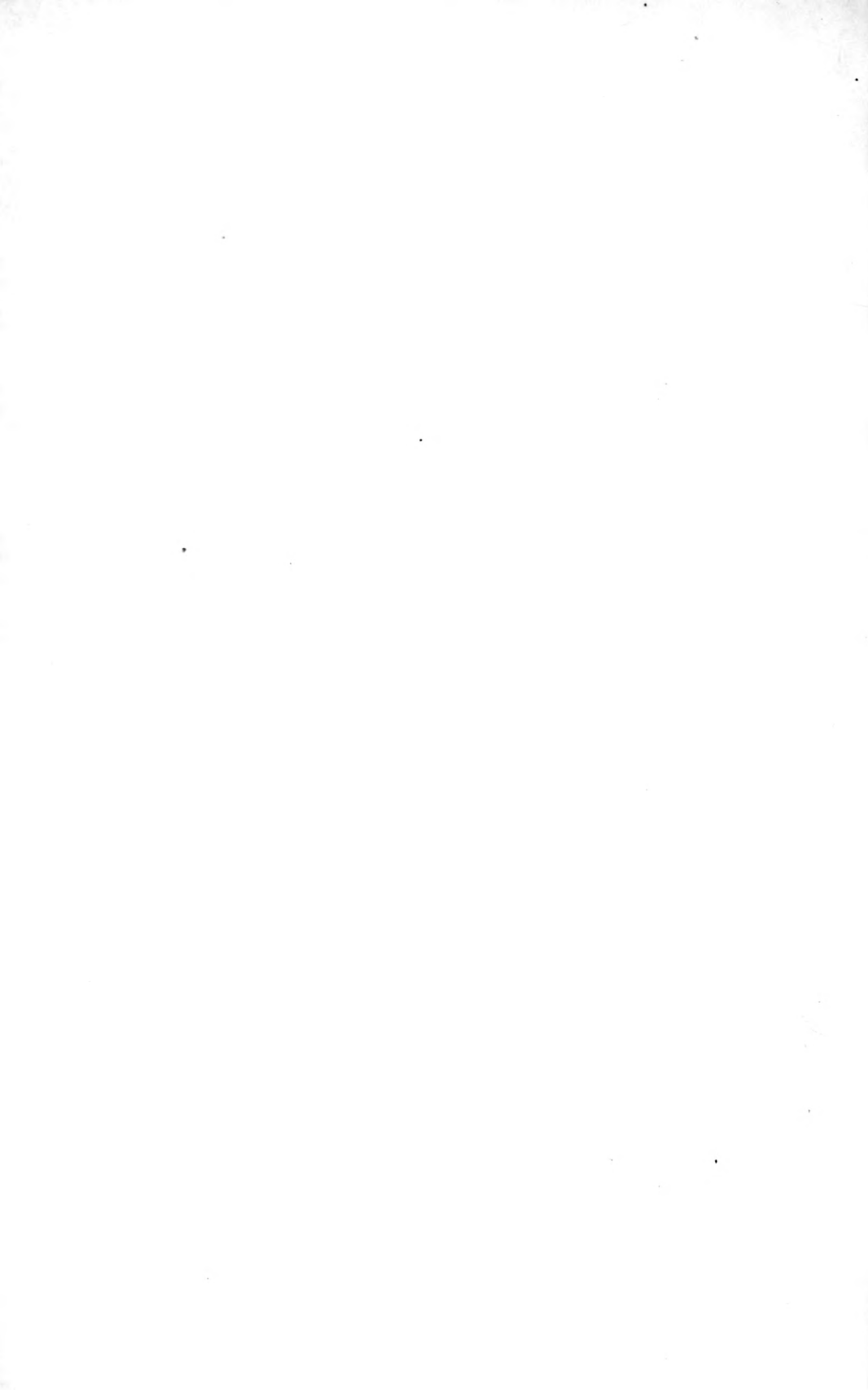
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THE
AMERICAN YEAR-BOOK
OF
MEDICINE AND SURGERY

BEING

A Yearly Digest of Scientific Progress and Authoritative
Opinion in all Branches of Medicine and Surgery,
drawn from Journals, Monographs, and Text-
Books of the Leading American and Foreign
Authors and Investigators

COLLECTED AND ARRANGED

WITH CRITICAL EDITORIAL COMMENTS

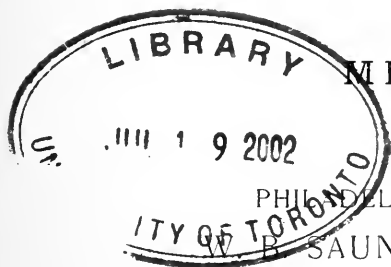
BY

SAMUEL W. ABBOTT, M.D.,
ARCHIBALD CHURCH, M.D.,
LOUIS A. DUHRING, M.D.,
D. L. EDSALL, M.D.,
ALFRED HAND, JR., M.D.,
MILTON B. HARTZELL, M.D.,
REID HUNT, M.D.,
WYATT JOHNSTON, M.D.,

WALTER JONES, Ph.D.,
A. O. J. KELLY, M.D.,
DAVID RIESMAN, M.D.,
LOUIS STARR, M.D.,
ALFRED STENGEL, M.D.,
A. A. STEVENS, M.D.,
G. N. STEWART, M.D.,
REYNOLD W. WILCOX, M.D.

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GEORGE M. GOULD, M.D.



PHILADELPHIA AND LONDON

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|--|--------------------------|
| <p>SAMUEL W. ABBOTT, M.D.,
Secretary of the Massachusetts State Board of Health.</p> | <p>BOSTON, MASS.</p> |
| <p>ARCHIBALD CHURCH, M.D.,
Professor of Nervous and Mental Diseases and Medical Jurisprudence, Northwestern
University Medical School, Chicago, Ill.</p> | <p>CHICAGO, ILL.</p> |
| <p>LOUIS A. DUHRING, M.D.,
Professor of Diseases of the Skin, University of Pennsylvania.</p> | <p>PHILADELPHIA, PA.</p> |
| <p>D. L. EDSALL, M.D.,
In-tructor in Clinical Medicine, University of Pennsylvania; Associate in the Pepper
Laboratory of Clinical Medicine; Physician to St. Christopher's Hospital for Children.</p> | <p>PHILADELPHIA, PA.</p> |
| <p>ALFRED HAND, JR., M.D.,
Dispensary Physician and Pathologist to the Children's Hospital; Bacteriologist to
the Bryn Mawr Hospital; Pathologist to St. Joseph's Hospital, Philadelphia.</p> | <p>PHILADELPHIA, PA.</p> |
| <p>M. B. HARTZELL, M.D.,
Instructor in Dermatology, University of Pennsylvania.</p> | <p>PHILADELPHIA, PA.</p> |
| <p>REID HUNT, M.D., Ph.D.,
Associate Professor of Pharmacology, Johns Hopkins Medical School, Baltimore, Md.</p> | <p>BALTIMORE, MD.</p> |
| <p>* WYATT JOHNSTON, M.D.,
Assistant Professor of Hygiene and Lecturer on Medico-Legal Pathology, McGill
University, Montreal, Canada.</p> | <p>MONTREAL, CANADA.</p> |
| <p>WALTER JONES, Ph.D.,
Associate Professor of Physiologic Chemistry and Toxicology, Johns Hopkins Medical
School, Baltimore, Md.</p> | <p>BALTIMORE, MD.</p> |
| <p>ALOYSIUS O. J. KELLY, M.D.,
Instructor in Clinical Medicine and Assistant Physician to the Hospital, University
of Pennsylvania; Pathologist to the German Hospital of Philadelphia; Professor of the
Theory and Practice of Medicine in the University of Vermont.</p> | <p>PHILADELPHIA, PA.</p> |
| <p>DAVID RIESMAN, M.D.,
Instructor in Clinical Medicine, University of Pennsylvania; Professor of Clinical
Medicine and Therapeutics, Philadelphia Polyclinic.</p> | <p>PHILADELPHIA, PA.</p> |
| <p>LOUIS STARR, M.D.,
Late Clinical Professor of Diseases of Children in the Hospital of the University of
Pennsylvania; Late Physician to the Children's Hospital, Philadelphia.</p> | <p>PHILADELPHIA, PA.</p> |
| <p>ALFRED STENGEL, M.D.,
Professor of Clinical Medicine, University of Pennsylvania; Visiting Physician to
the Pennsylvania Hospital.</p> | <p>PHILADELPHIA, PA.</p> |
| <p>A. A. STEVENS, M.D.,
Lecturer on Physical Diagnosis, University of Pennsylvania; Physician to St. Agnes'
Hospital, Philadelphia.</p> | <p>PHILADELPHIA, PA.</p> |
| <p>G. N. STEWART, M.D.,
Professor of Physiology and Histology, Western Reserve University, Cleveland, Ohio.</p> | <p>CLEVELAND, OHIO.</p> |
| <p>REYNOLD W. WILCOX, M.D.,
Professor of Medicine and Therapeutics at the New York Post-Graduate Medical
School, and Physician to the Hospital; Physician to St. Mark's Hospital.</p> | <p>NEW YORK CITY.</p> |

PREFACE.

THE single change in the editorial department is occasioned by the absence of Dr. W. W. Keen from the United States. Subscribers will be glad that Dr. J. Chalmers DaCosta has consented to take charge of the department of Surgery, with the assistance of Dr. J. H. Gibbon.

GEO. M. GOULD.

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GENERAL MEDICINE.

BY ALFRED STENGEL, M.D., AND D. L. EDSALL, M.D.,
OF PHILADELPHIA.

GENERAL SUMMARY OF THE YEAR'S WORK.

The passing year has been one of unusual activity in a number of directions, and it would be impossible to summarize even in the form of mere headings all of the important contributions. It must suffice, therefore, to indicate some of the most significant advances.

Bacteriologists and clinicians have been successfully engaged in the study of modes of propagation of various infectious diseases, among which malaria, yellow fever, and the plague are conspicuous examples. The propagation of malaria by mosquitos was a settled fact when the last volume of the YEAR-BOOK appeared, so that the present year's progress has been rather in the direction of amplification. The habits of the insects have been studied with greater care than ever, and knowledge regarding the varieties and their several peculiarities has become general. In a number of places experiments have been made at extermination of the mosquito by the use of petroleum and other destructive agents. These are spread over the surfaces of pools and collections of water of all descriptions so as to destroy the larvas, and the results thus far seem to be very encouraging. Measures of this sort in connection with active operations to improve drainage will undoubtedly render healthful many portions of the world now considered practically uninhabitable.

The mosquito was suggested as the carrier of the germ of yellow fever by Finlay, of Havana, many years ago, but there seemed then so little likelihood of this mode of transmission being possible that a prominent authority scouted the idea. The same theory has again appeared, and the American Yellow Fever Commission has brought forward proofs which seem practically conclusive that the mosquito is an occasional, if not the frequent and invariable, carrier of the contagion. The earlier communications of this American Commission were not conclusive, and several prominent authorities expressed doubt regarding the work. Subsequent communications, however, seem to us to establish the facts claimed. With regard to the etiology of the disease, both the American and English Commissions oppose the claims of the bacillus of Sanarelli, and the British Commission refer to an organism seen by them which they look upon as the likely cause.

The mode of dissemination of the plague has been fairly well established, but a number of minor points have been added to the knowledge of the pathology and clinical manifestations, and the occurrence of a number of cases in San Francisco is of vital interest to the profession in America, but the report of the Commission sent by the Government to investigate this outbreak has not as yet appeared in its final form and will be referred to next year.

Interest in the study of tuberculosis in all its phases increases yearly. A belief in the possibility of limitation and perhaps extermination of this disease has yearly grown. The congress which met in London during July, 1901, was the most important assemblage ever gathered together for the discussion and study of this disease, and created much interest throughout the scientific world. To the surprise of every one acquainted with his previous communications and the existing knowledge, Prof. Robert Koch announced his conviction, based upon experiments, that bovine tuberculosis and human tuberculosis are distinct diseases, and that transmission from cattle to man through milk or meat is therefore impossible. This communication, if true, is one of enormous economic importance, for the sums expended yearly in the destruction of tuberculous cattle and the condemnation of milk of tuberculous cows, as well as in other ways connected with the subject, are enormous. Unfortunately, Koch's opinion is based upon most inconclusive experiments, all of which are of a negative character, and furthermore his views are opposed and successfully contradicted by the conclusive experiments of Dr. Ravenel, of the University of Pennsylvania. Ravenel has shown the essential identity of human and bovine tuberculosis, though his experiments at the same time prove the variations in these diseases. He has recorded three positive instances of transference of tuberculosis from the cow to man, and has performed a number of experiments indicating the possibility of production of tuberculosis in cattle by inoculation with sputa and other materials from man. The unfortunate statement of Koch may therefore be said to have been disproved by Ravenel, and it is particularly satisfactory that this opposing testimony was offered at the same congress and not afterward. The far-reaching effects of such a statement may be seen from the fact that within 48 hours of the delivery of Koch's address the English Parliament was petitioned by the milk-producers and the butchers of Great Britain to relieve their respective trades of restrictive legislation. Vigorous opposition of the sanitarians alone prevented hasty action in this matter.

TYPHOID FEVER.

Etiology.—Nothing of consequence has been added to previous knowledge regarding the etiology of typhoid fever in the past year. A number of interesting studies of the distribution and elimination from the body of the bacilli have been published, and some of them will be referred to. The question of personal and racial susceptibility

or immunity has not been sufficiently considered in recent years. The specific cause has been too constantly kept in mind, and the liability to infection—either acquired or natural—has been neglected. The story of armies in camp is interesting in this connection, and much useful information may be obtained from the official reports of the Spanish-American and South African wars.

Clark¹ notes that the **Chinese** in Hong-kong are apparently to **some extent immune to typhoid fever**. There were in that city in 2 years 51 certain cases of typhoid fever in Chinese and 65 in foreigners. When these figures are considered in connection with the fact that 94 % of the inhabitants are Chinese, it would seem that there is a distinct immunity among the Chinese to this disease, particularly since they live under much poorer hygienic surroundings than foreigners. This immunity is probably acquired, and is reached by passing through typhoid fever in childhood. Undoubtedly a large percentage of the Chinese have the disease in early childhood.

[The manner of dissemination of the bacilli is often difficult or impossible to trace. Considerable epidemics in localities usually quite free from the disease occasionally furnish conditions permitting positive conclusions, as in the epidemic reported by Fraenkel, and at other times the number of cases occurring simultaneously or in quick succession makes the problem simple.] P. Fraenkel² reports an **epidemic of typhoid fever** which occurred in Göttingen in the summer of 1900. At the time mentioned there was a severe outbreak of typhoid, and in all 51 cases occurred. Previously the town had been for years almost entirely free from typhoid fever, securing of a satisfactory water-supply having apparently almost stamped out the disease. The cases occurred in 3 groups, the first including 26 cases, which were seen within a very brief period. These were evidently due to one local source of infection, as they all occurred in persons who frequented one small inn, and many of the patients had eaten at this place regularly. The infection probably occurred from a well from which those who were infected had frequently drunk. The second group occurred in persons who lived in various parts of the town, and probably all these persons were infected from the first group of patients. It was definitely known that one in this group, a servant, had done washing for a patient in the first group. The cases in the third group came from the neighborhood of Göttingen. The exact manner in which they were infected could not be determined. The disease was extremely severe in the first group, 7 of the 26 patients dying, a mortality of 23.1 %, while the customary mortality in the Göttingen hospital for some years has been about 8 %. The disease was also notable for the rarity of bronchitis, only 11.5 % showing signs of bronchitis. The duration was notably long. The average duration of treatment in the first group was 57 days; in 6 instances it was necessary to continue treatment for from 70 to 109 days. Of the 9 fatal cases in the total series, 6 occurred from severe general infection, and 3 from complica-

¹ Brit. Med. Jour., Jan. 16, 1901.

² Deut. med. Woch., Mar. 21, 1901.

tions. In one case there was an anomaly which, while common, is considered by Fraenkel to have had possibly close relation to the fatal issue. The patient, a student, had shown no signs of cardiac weakness during life excepting during active exercise, when he had had repeated attacks of temporary heart-failure. The necropsy in his case showed a marked acute degeneration of the heart, and the presence of but one coronary artery. Fraenkel is inclined to think that the single coronary was sufficient under ordinary circumstances, but that under the stress of excessive muscular exercise it was insufficient to maintain proper circulation, and that the attacks of heart-failure had resulted from this cause; and he also thinks that the single coronary was insufficient to maintain the resistance of the heart against the action of the typhoid toxin.

T. J. Walker¹ reports an outbreak of typhoid fever which appeared to be due to **infection of a well** by a convalescent soldier from South Africa. The inmates of two houses who took their drinking water from one well had been entirely free from typhoid fever for at least a year. Seventeen days after the return of the convalescent a case of typhoid fever appeared, and within about 2 weeks 12 persons in all sickened with the disease, and all of these had drunk water from the well. Walker thinks that the **regular use of urotropin** in the returning convalescent soldiers would be a satisfactory means of avoiding many cases of infection. [The danger occasioned by persistence of bacilluria for a long time after the apparent convalescence of typhoid fever has not been sufficiently recognized by practitioners, although scientific investigators in all parts of the world have given warning. The suggestion of the author is timely and involves no great difficulty.]

E. Barth² reports an epidemic of typhoid fever which occurred in soldiers, and which could be satisfactorily traced to the fact that **500 soldiers had been supplied with water from an infected stream** on one day; 13.5% of the soldiers who drank this water were taken with typhoid fever, most of the cases occurring in those who had partaken first of the infected water; those who had drunk later largely escaped, probably because more sterile ground-water had flowed into the stream meanwhile. The period of incubation averaged between 1 and 5 weeks; it was usually about 4 weeks. A short period of incubation usually indicated a severe case. The Widal reaction was absent in 12% of the positive cases. The diazo reaction he considers a more satisfactory means of diagnosis, and particularly a better indication of the severity of the disease. He made the interesting observation that there was an increase of weight immediately after the beginning of the afebrile period. At this time, in spite of the fact that the same diet was continued, the patients showed on the average a gain of about 1 pound a day for about 2 weeks. In the third week, in spite of the fact that the diet was increased to the point at which it contained about 4000 to 4500 calories, the increase in weight was only about half what it had been in the previous 2 weeks on a diet containing 2800 to 3000 calories.

¹ Brit. Med. Jour., Nov. 24, 1900.

² Zeit. f. klin. Med., Bd. XLI.

H. H. Tooth,¹ in a discussion of his personal experience in typhoid fever in the troops in South Africa, directs attention to the **importance of sand-storms in the dissemination of the disease**, the sand being blown about in every direction, and opportunity being given in this way for contamination of practically every article of food. Flies he considers to have been active also. The water-supply was probably contaminated. Direct infection from other cases he considers comparatively rare. He looks favorably upon preventive inoculation.

A. C. Houston,² in discussing the success of the modern method of endeavoring to remove the typhoid bacillus and allied organisms from the sewage, states that the **mechanical separation of microorganisms from the sewage** by the use of bacterial filter-beds is practically impossible, and while chemie and bacteriologic changes probably take place in the passage of the sewage through the filter-beds, the outflow is nearly as dangerous as the inflow. In demonstrating this, Houston investigated the growth of *Bacillus coli communis* and *Bacillus enteritidis sporogenes* in cultures taken from the sewage before it reached the filter-beds and after filtering. There was no very definite reduction in the number of these organisms in the outflow, and they were still present in large numbers. It seems probable, therefore, that other organisms would pass through, and the effluent from the filter-beds cannot wisely be considered safer than the original sewage. [The value of efficient sand filtration carried out on a large scale by cities cannot be questioned. Rigid supervision of every detail is of course essential. Ordinary filters are often worse than useless.]

J. H. Linsley and B. H. Stone³ insist upon the importance of **bacteriologic examination of drinking water**, and as evidence of this state that in examining 509 specimens of drinking water they found colon bacilli in 56 instances and atypical colon bacilli in 8 further instances. In all there were 78 positive bacteriologic examinations, while chemie evidence of impurity was present in only 31. They consider the discovery of the colon bacillus sufficient proof of pollution with sewage. They also direct attention to the serious importance of the colon bacillus in causing disease, and describe cases which resembled typhoid fever, but did not give the Widal reaction with the typhoid organism. Further investigation showed that the milk-supply of these patients contained a microorganism with the characteristics of the colon bacillus, the affection apparently coming from an old well, the water of which was used for washing the milk cans.

Dissemination of the Typhoid Bacillus.—The occurrence of the typhoid bacillus in the general circulation and in various localities distant from the original foci of infection is very much more frequent than has been generally recognized. Numbers of cases of typhoid septiceemia and of nonintestinal forms of typhoid infection have been recorded in recent years. In large measure the recognition of such cases is due to the introduction of the method of serodiagnosis. The total number

¹ Lancet, Mar. 16, 1901.

² Brit. Med. Jour., Aug. 18, 1900.

³ Med. Rec., Sept. 1, 1900.

of observations does not permit of even an approximation to the proportion of cases of nonintestinal infection, but the statistics will soon be sufficient for this purpose.

Schottmüller¹ states that in the examination of 50 cases of typhoid fever he found 40 typical **typhoid bacilli in the circulating blood** upon culture. He chiefly directs attention, in this report, to one case which was apparently not typhoid fever. The onset was somewhat unusual, following an erysipeloid inflammation of the left hand. With this exception, the course and defervescence were quite typical of typhoid fever; there was enlargement of the spleen, and typical rose-spots were seen. Cultures from the blood, however, showed the presence of a bacillus which closely resembled the typhoid bacillus, but differed from it in that while it reacted to the patient's blood-serum, it did not react to typical typhoid blood-serum; the patient's blood also did not cause agglutination of typical typhoid bacilli. The writer therefore considers that this was not typhoid fever, and thinks that it is possible that a certain number of cases commonly thought to be sporadic typhoid will prove to have another cause than the typhoid bacillus. He thinks such cases should be carefully investigated.

H. G. Turney² reports an unusually interesting case of **typhoid septicemia** which occurred in a girl of 13, who had been feeling badly for some time, and who was taken seriously ill on January 16th with increasing nervous symptoms; she became unconscious on the 23d, and remained almost wholly unconscious until the time of her death on February 2d. There were no localizing signs of any cerebral trouble, the reflexes were normal, and optic neuritis was absent. The spleen could not be felt, but there were spots on the abdomen, and the Widal reaction was definitely positive. The diagnosis could not be definitely established. Repeated lumbar punctures were negative, no fluid being obtained. The necropsy showed a normal condition of the gastrointestinal tract without any involvement even of the lymphoid follicles; the mesenteric glands were enlarged, however, the spleen also slightly so, and cultures made from this organ showed typical typhoid bacilli. Turney divides cases of typhoid septicemia into those which run a typical clinical course, but lack the usual local lesions, and those which run an atypical course and also lack the local lesions. The case reported belongs to the latter class.

M. Auerbach and E. Unger³ report their examination of 10 clinically certain cases of typhoid fever for **typhoid bacilli in the circulation**. They withdrew a small amount of blood from a vein by introducing a needle and placed the blood in an Ehrlemeyer flask containing about 300 cc. of bouillon. When examined after 18 to 24 hours they were able at once in all cases to discover bacilli in hanging drop preparations. The bacilli were afterward identified by the usual measures. The examinations were made between the twelfth and forty-second day of the disease. Only one of these cases was very severe, and this ended in death. The other

¹ Deut. med. Woch., Aug. 9, 1900.

² Lancet, Sept. 29, 1900.

³ Deut. med. Woch., Dec. 6, 1900.

cases were mild, or only moderately severe. They believe that this method will prove to be one of marked diagnostic importance. It is not much more difficult to carry out than the Widal test or bacteriologic investigation of the spots, and in one case the diagnosis was made secure by this means when with a rather typical clinical appearance and a positive diazo reaction the spots and Widal reaction were negative. [Our own experience with blood cultures has not encouraged us in believing that this method will prove especially useful to the diagnostician. Its greatest value is in its scientific relation.]

E. Scholz and P. Krause¹ discuss the **bacteriologic methods of diagnosis** of typhoid fever. As to the Widal reaction, Scholz considers that it is of comparatively little value. He believes that it is to be classed among the general symptoms of typhoid fever, any of which may be absent or may appear so late as to be of no value in diagnosis. He insists that proper observation of the general course of the disease is the most important method of diagnosis. [His investigations concerning the Widal reaction were limited to 55 cases, and can therefore not be considered to be of very great value as compared with the large number of cases that have been investigated by others. The reaction is undoubtedly the closest approach to an absolute sign of the existence of typhoid fever that we have, and although it not infrequently appears late and is not always present, and although it may in rare instances be present in other diseases, and cannot therefore be looked upon as an absolute sign, it is certainly a valuable one.] Of Scholz's 55 cases, 47 were positive and 8 negative, and 3 of the positive cases showed the reaction only after 5 weeks. It is to be observed that in the negative cases there were 2 in which the last test was made on the ninth day, and 2 others in which the test was undertaken last on the eighteenth and twenty-fifth days respectively. Of the 4 remaining cases the test was made as late as the sixty-second and one hundred and sixth days. Krause discusses the bacteriologic examination of the spots for typhoid bacilli. He thinks this is a more important method of examination than the Widal test, for in 14 of 16 cases he obtained cultures of characteristic bacilli, and in 5 cases in which he found bacilli the agglutination test was negative. He admits freely, however, that the bacilli are likely to disappear from the spots within a few days after their appearance, and this makes it necessary to make several examinations of spots, particularly fresh ones. Also spots are absent in a considerable number of cases and it is readily possible to confuse other eruptions with the typhoid eruption; the spots may not appear sufficiently early to be of real aid in diagnosis, and bacilli cannot always be obtained from them. [This is a method which is by no means of constant value, and it also has such technical difficulties connected with it, and is so uncomfortable for the patient, that it is not likely to replace the Widal reaction as a general method of diagnosis.] Krause believes that in carrying out this method several fairly deep incisions should be made into each spot, and the surface should be scratched thoroughly when preparing to inoculate the media. He also reports his

¹ Zeit. f. klin. Med., Bd. XLI, H. 5 und 6.

results with Piorkowski's method. In 19 cases he made a total of 123 tests. In three-fourths of these cases the test was positive; in 4, bacilli with the characteristics of the typhoid bacilli were not obtained. He considers the culture medium recommended by Piorkowski a valuable addition to bacteriologic methods, but believes that the appearance of plate cultures alone is not sufficient for a diagnosis of typhoid fever. It is always essential to carry out the usual chemic and biologic tests before stating that the bacilli are actually typhoid bacilli. He has found that if the urine used in the preparation of the medium is inoculated with *Micrococcus ureæ* and kept in the thermostat for from 24 to 48 hours, it will be found to be already alkaline. By this means one may avoid prolonged and tiresome waiting for the urine to become spontaneously alkaline. The medium, however, readily becomes fluid, and cannot be used in warm weather. [A study of reported observations is convincing that, however important from a scientific point of view, and even as an occasional diagnostic aid, cultural methods may be, they cannot take the places of the clinical diagnosis supplemented by the Widal and diazo reactions. Any method may fail in a given case, the culture method being no exception.]

H. C. Berends¹ has investigated 16 cases of typhoid fever by **Piorkowski's method**, and obtained positive results in but 3 instances. He considers with other observers that the plate colonies are not usually sufficiently typical to allow of certain distinction between typhoid and colon bacilli, and the difficulty of preparation of the medium, he thinks, makes the method of little use in practice.

F. Neufeld² gives a brief review of the question of **typhoid bacilluria**, and reports that in the examination of 12 cases he has himself discovered a bacilluria in 3 instances. He had useful results from the administration of urotropin, but notes that the urotropin does not make the patient secure from further infection, and that it should be used for weeks if bacilluria has once appeared. He directs attention to the very great importance of typhoid bacilluria from a hygienic standpoint, and recommends that, besides in private practice, it should be particularly looked for in the army, where it is likely to be the cause of extremely severe epidemics, and where it can usually be satisfactorily controlled by the proper use of urotropin. He believes that if the urine in typhoid becomes cloudy, urotropin should be administered at once if it is impossible to make a bacteriologic examination. Other forms of bacilluria besides that due to the typhoid bacillus have been observed, however, and Neufeld describes one in which the bacilluria was due to the colon bacillus. As a rule these forms of bacilluria do not yield to urotropin, and he thinks that if the use of urotropin causes the cloudiness of the urine to disappear after a short time, it may safely be decided that the bacilluria was typhoidal, while if it does not disappear the bacilluria was due to some other organism.

Schumburg³ insists that while **urotropin** does inhibit the growth of

¹ Dissertation, Utrecht, 1900.

² Deut. med. Woch., Dec. 20, 1900.

³ Deut. med. Woch., Feb. 28, 1901.

typhoid bacilli in the urine, it **does not actually kill the bacilli**, and that the teaching concerning the action of this drug is erroneous. Through the inhibition of the growth of the bacilli it does produce good results upon the local lesions or prevents local infection, but he considers that urotropin does not do away with the possibility of infecting others in the neighborhood of the patient. The proof which he offers in the support of this view is the observation that when sterile urine, collected from a patient who was taking 3 or 4 grams of urotropin daily, was added to cultures of typhoid bacilli, it either largely reduced or entirely restricted the growth of the bacilli; but if these bacilli were afterward inoculated upon bouillon containing no urotropin, they again grew actively and became virulent. He believes that this demonstrates that the use of urotropin for disinfection of the urine is quite as likely to do harm as good, as it gives those who use it a false feeling of security and thereby gives opportunity for infection when infection would not occur if real antiseptics were added to the urine. [These experiments should be repeated. The results of other investigators do not coincide with those of the author.]

N. B. Gwyn¹ discusses the important role played by **urine infected with typhoid bacilli in disseminating** typhoid fever, and reports the work which he has recently done in studying the effects of a number of antiseptics upon living typhoid bacilli in the urine. He considers that milk of lime cannot be considered to be an actual disinfectant when used for this purpose, and that carbolic acid is of use only when added in large amounts and in strong solution. Formalin is an efficient disinfectant, but the expense of its use makes it of relatively little value. He found bichlorid of mercury, chlorinated lime, and liquid chlorids to be very valuable and efficient in relatively dilute solutions. They also have a rapid action. If one would kill the bacilli within 5 minutes, he states that one must use a quantity of 1 : 2 carbolic acid equal to half the volume of urine to be disinfected, or two-thirds this volume of a 1 : 40 carbolic acid solution. One-fifth the volume of a 1 : 1000 bichlorid of mercury solution suffices, and three-tenths of the volume of a 10% formalin solution, while one-fortieth the volume of saturated chlorinated lime, and two-fifths the volume of liquid chlorids is the proper quantity. The presence of albumin in the urine has been thought by some authors to interfere with the action of disinfectants. This idea was not supported by Gwyn's work, the action being quite as satisfactory in albuminous urines as in those free from albumin. For irrigation of the bladder he recommends the use of bichlorid of mercury in the strength of 1 : 100,000 to 1 : 50,000. The only drug which he considers to be of any value as an antiseptic when used by the mouth is urotropin.

H. Kirschmann² reports 2 cases of **typhoid cystitis**, both of which had the characteristics that the bacilli were found in pure culture in the urine, that the urine was distinctly acid in reaction, and that the inflammation of the bladder appeared during convalescence after the pre-

¹ Phila. Med. Jour., Jan. 12, 1901.

² Münch. med. Woch., 1900, No. 220.

ceding febrile albuminuria. The course was mild, and they responded readily to treatment, only 1 case requiring local treatment. The typhoid bacillus alone was looked upon as the cause of the cystitis, and the explanation which Krauss offers for the infrequent occurrence of any actual bladder trouble in typhoid is that it occurs only when there is some general or local predisposition on the part of the patient.

C. W. Mitchell¹ describes the case of a woman of 33 who had repeated attacks of **cholelithiasis** which finally became severe and frequently repeated. Operation was undertaken. A stone was found in the common duct. Cultures made from the contents of the common duct showed typical typhoid bacilli, and the blood of the patient gave a marked reaction in a dilution of 1 to 50, both with a known typhoid bacillus and with the organism isolated from the common duct of the patient. The condition was thought to be one of **local typhoidal infection**, and it was believed that the patient had never had general typhoid fever.

T. J. MacLagan,² in discussing the **intestinal lesions described in typhoid fever**, suggests that these occur in the lower part of the small bowel because of the greater amount of lymphatic tissue present at that point. He believes that the bacilli act directly in producing these lesions, and that the other symptoms of the disease are due chiefly to secondary infection. He considers that the toxin cannot be chiefly active in the production of local lesions, because in such case he would expect all glands to be about equally affected, while the lesions are usually chiefly local.

J. G. Hanson³ reports a case in which **malaria and typhoid fever coexisted**. The patient was a man of 23. The initial symptoms were those of typhoid fever, and the case ran the course of typhoid fever until convalescence had begun, when there were sudden rises of temperature, and plasmodia were found. Quinin was given, and convalescence was subsequently uninterrupted. There was during the course of the disease a tendency to paroxysmal sweating and a wide temperature range, which had suggested a malarial complication, but distinct signs of it did not appear until convalescence.

Symptoms and Complications.—Little has been added to previous knowledge of the symptoms of typhoid fever, but complications, and especially sequels, are now recognized as the direct consequence of the infections which were formerly looked upon as accidental or mere coincidences. This is particularly true of certain surgical conditions, like bone lesions, some of which may follow the attack of fever by considerable intervals.

P. Fraenkel,⁴ in continuing his article on the Göttingen epidemic, mentions one case of death from the **rare complication of diphtheria**. Two other cases of death occurred from **thrombosis of the veins of the legs**. The general tendency of the fever in this epidemic was to be prolonged and high. In one case fever lasted for 9 weeks. A sub-

¹ Maryland Med. Jour., Jan., 1901.

² Lancet, Dec. 8, 1900.

³ Med. Rec., Sept. 15, 1900.

⁴ Deut. med. Woch., Mar. 20, 1901.

normal stage of the temperature was reached in only 11 cases; 3 cases showed a subnormal stage only after the appearance of relapse, but this fact is not of marked prognostic importance, as many cases that did not relapse showed no subnormal stage, and one case that did relapse had previously shown this stage. There were 8 definite relapses, a large percentage. Nervous symptoms were very marked, as a rule, and an onset with severe delirium usually indicated a bad prognosis. In one case there was melancholia at the onset, and for 6 weeks after the course of the fever a curiously sleepy condition, with slow, scanning speech and mental confusion; there was no subsequent memory of this period. Tonic muscular spasm was repeatedly observed, and when it involved the extensors of the arm it always indicated a fatal issue. A study of the reflexes showed that they were excited in only 3 cases, an observation which is contrary to the statements of Strümpell and Curschmann. In all the other cases they were either definitely decreased or absolutely lost; in 22 cases they could not be elicited. In convalescents, however, they tended to be increased. Hemorrhage from the nose was seen in 38%. Severe stomatitis, without notable subjective symptoms, was seen at the onset in 1 case. The diazo reaction was absent in 14 cases at the time of admission, though in 11 of these cases the diagnosis could be made at the time on clinical grounds. Fraenkel considers this reaction of no value in diagnosis. Acetone was repeatedly found, but he believes only when insufficient nourishment was being given; he therefore considers acetonuria the result of inanition. The Widal test was made in 24 cases in a dilution of 1 to 40; it was positive in 20 instances, doubtful once, and 3 times negative at first. In the 3 latter cases the last negative test was on the fifth, tenth, and eleventh days. Apparently all of these cases subsequently gave the reaction. Of these, 2 cases were of interest because they were permanently afebrile; in one the diagnosis could be definitely made because the patient was a regular guest of the inn from which the infection came in the early series of cases, and because of his general symptoms and the occurrence of diarrhea and enlarged spleen. In the other afebrile case there was no etiologic relationship, but the spleen was enlarged, there was bronchitis, and the tongue and stools were typical.

W. Osler,¹ in a general summary of the cases of **typhoid fever treated in the Johns Hopkins Hospital for 10 years**, states that 829 cases are included in the summary. The service was entirely under his control, and therefore all the records, methods of treatment, and observations were uniform. There were 631 cases in males and 198 in females; 729 were white and 100 colored. The largest number of cases in any decade—393—occurred between the ages of 20 and 30. The admissions in August, September, October, and November were much greater in number than in any other months. There were 63 deaths, a total mortality of 7.5%. This includes the cases admitted in moribund condition. The method of treatment consists chiefly in careful nursing, a diet of milk diluted with lime-water, and egg-albumen and tub baths.

¹ Phila. Med. Jour., Oct. 13, 1900.

The food is rarely predigested, and artificial foods are not often given. Gastric and intestinal complications were uncommon. The patients were given cold water in abundance. The tub bath at 70° is usually given, but sometimes ice-cold sponges are substituted. Drugs are, as a rule, not given. If the circulation begins to fail, whisky or strychnia is prescribed. Antipyretics and intestinal disinfectants are not used. As to the symptoms of onset, headache occurred in a large majority of cases—598; loss of appetite was nearly as common; diarrhea occurred in 322 cases; cough in 233; abdominal pain in 227; chilly sensations in 213; actual chills in 200 cases, 107 of these having a single chill, and 93 having 2 or more chills; vomiting was present at the onset in 209 instances; epistaxis in 182; constipation in 152; delirium in only 151 cases. Sore throat was present in 20; deafness was noted in only 8 cases; in 4 cases hemorrhage from the bowel was an early symptom; rose-spots were seen in 666 cases; in 592 cases the rectal temperature rose above 104°, in 240 it reached between 105° and 106°, in 27 between 106° and 107°, and was over 107° in 6 cases. Diarrhea during the course of the disease, in the hospital, was present in only 19%; 34% showed constipation. The infrequency of diarrhea is attributed to the fact that laxatives and antiseptics are not used. As to the spleen, Osler states that the chief reliance in determining the size is placed upon palpation. The spleen was palpable in 591 cases (71%). Osler recognizes two forms of relapses—a genuine reinfection in the period of apyrexia, and an intercurrent relapse which appears before the temperature has become entirely normal. He believes that the occurrence of relapse is, as a rule, beyond the control of the physician. The frequent occurrence of relapse is an indication that immunity in typhoid fever is slowly acquired, and is not usually reached at the period of apyrexia. Eighty-six relapses occurred in the series, somewhat more than 10%. The periods of complete apyrexia before the occurrence of relapse varied from 1 to 36 days. In discussing posttyphoidal variations of temperature he notes that a daily rise to 100° or 100.5° is not uncommon in nervous patients, in protracted cases, and in children. If the spleen is not palpable, the tongue is clean, the appetite and strength improving, and there are no typhoid bacilli in the urine, this condition should be treated by giving solid food, allowing the patient to sit up, and stopping the taking of the temperature. Low temperature was seen following the tub bath, particularly in the third week, spontaneously in the third and fourth weeks, the drops reaching as low as 94.5° following hemorrhage, and it is a very common sign during convalescence. In the latter case the hypothermia may be quite protracted. Osler notes that it is not sufficiently recognized that fever with chills may recur for several weeks in the convalescence from typhoid fever without any signs of local trouble. Hemorrhage occurred in 50 patients, 5 of whom died. There were 23 cases of perforation, in 3 of which the patients were saved by operation. Blood was vomited in 1 case. Sixteen cases of phlebitis occurred; in 14 of them it was on the left side. Pneumonia is divided into two groups—pneumonia at the onset and pneumonia during the

course. In the first form the diagnosis of typhoid fever is likely to be overlooked altogether. Pneumonia during the course is a very serious complication; it was seen 15 times. Albumin was present in the urine in 74% of the cases, tube casts in 47%. The diazo reaction was positive in 543 out of 796 cases; that is, 68%. He saw no cases in which there was an actual acute typhoid nephritis. There were 2 cases of orchitis, and herpes, though frequently stated to be rare, was seen in 29 patients.

H. H. Chown¹ reported to the Canadian Medical Association 2 cases of **gangrene of the leg in typhoid fever**, appearing on the eleventh day of the disease in the first case, and on the ninth in the second case. In both cases amputation of the leg was carried out, and both patients recovered completely. In discussion, R. B. Nevitt spoke of a similar case in which also amputation was performed. In this case gangrene appeared about the third week of the disease. He also spoke of a case of gangrene of the arm following an attack of pneumonia. [One case of gangrene of the leg has come under our observation. Amputation was practised, but the patient succumbed.]

Anden² has collected and tabulated 21 cases of **gangrene as a complication of typhoid fever**, including 3 of his own cases of this rare condition, which developed during a period of 18 months at St. Bartholomew's Hospital. In 2 of his cases there was thrombosis; in one, of the right femoral artery, and in the other, of both popliteal arteries, with consequent gangrene, necessitating amputation of the leg and amputation of both feet respectively. The third case showed definite thrombosis of the left femoral artery, with cyanosis of the skin, and the other usual accompanying symptoms, but without actual gangrene. The complication is most frequent in early adult life in males, and almost always confined to the lower limbs. There were 65.8% of recoveries. Anden favors the primary arteritis theory as being the probable cause of the clotting and gangrene in most cases, as opposed to the lodgment of an embolus, which, however, may occur in some cases with acute endocarditis or dilation of the heart. The possibility of the thrombus being of the nature of a marantic thrombus, or being due to blood changes, is entertained.

A. A. Eshner and T. H. Weisenberg³ report 2 cases of **hemorrhagic typhoid fever**. Epistaxis and hemorrhage from the bowels are frequently the usual forms of hemorrhage, but generalized hemorrhage occurs very rarely, and the term hemorrhagic typhoid has been applied to these. The hemorrhage may take place from any part of the body or into the serous cavity. Sometimes it represents the terminal stage of a fulminant case, but in other instances comes during the acute or in the later stages of ordinary cases. It has been observed during relapses that epistaxis is usually the first, followed by bleeding from the gums, and finally petechial eruptions occur, the roseola becoming hem-

¹ Med. News, Sept. 22, 1900, p. 476.

² Am. Jour. Med. Sci., Oct. 20, 1900, from St. Barthol. Hosp. Rep., 1898, vol. XXXV.

³ Am. Jour. Med. Sci., Mar., 1901.

orrhagic, or petechias independent of this forming. Rarely meningeal and cerebral hemorrhages have been observed. Intestinal hemorrhage or bleeding from the urinary tract, etc., is not infrequent. Their first case was in a man of 39, who had been a heavy drinker and was admitted to the hospital in a state of delirium on what appeared from the history to be the twenty-second day of the disease. He had continued drinking up to the time of his admission to the hospital. On the sixth day after admission a rose-red eruption appeared and bluish blotches of irregular character developed. He then began to pass blood with the urine. There had been few blood-corpuscles in the urine before that time. Soon hemorrhage from the bowels occurred, and the hemorrhagic eruption in the skin increased. The patient sank into coma and died. The autopsy showed extravasations of blood in the pericardial and pleural sacs. A large infarct in each lung, hemorrhages into the pelvis of the kidneys, and in the bladder, as well as in the stomach and intestines. The second case was in a man of 28, also an alcoholic. He was admitted in a state of delirium, with a history of a week's illness. In the course of 3 days a rose-colored eruption appeared, as well as other positive signs of typhoid fever. Somewhat later a dusky hemorrhagic eruption appeared and extended over the whole body. Subsequently the urine, which had contained some albumin and casts, showed blood casts. The patient became comatose and died, and autopsy revealed the lesions of typhoid fever. [Secondary infections probably play a part in the causation of some of the cases of hemorrhagic or purpuric typhoid fever. Systematic examinations of the blood from the veins will doubtless throw light on this question, and such examinations are now being made in various places.]

Nicholls and Learmonth¹ consider the **hemorrhagic diathesis in typhoid fever** and its relationship to purpuric conditions in general, with a full clinical and pathologic report of a case. The pathologic anatomy of their case showed "ulceration of the small, but principally of the large intestine; general hemorrhagic diathesis; mixed infection; multiple hemorrhages from the mouth and nose, the bowels, and into the skin, lungs, heart, spleen, kidney, intestines, bladder, gall-bladder, and connective tissues; small spleen; cloudy organs; acute diffuse nephritis; fatty degeneration of the capillaries of the lungs and kidneys; healed old duodenal ulcer; and right old pleural adhesions." They conclude that one main factor in causing the extensive hemorrhages was "the fatty degeneration of the basement membranes of the capillaries and of the various endothelial cells, which was so noticeable in the case of the lungs and kidneys." They regard the fatty degeneration as due, "not to any local action of bacteria, but to a condition of systemic intoxication and septicemia." Out of 12,000 typhoid cases collected from the literature, 18 instances of general hemorrhagic diathesis were noted. Comparatively little is known as yet as to the causative factors in this condition. A review of the literature on the etiology, pathology, symptoms, and treatment is given. It seems that

¹ Lancet, Feb. 2, 1901.

the bacterial origin of the hemorrhagic condition is extremely probable, though the final proof is wanting. The authors would regard "purpura hæmorrhagica" not as a distinct disease entity, but as merely a "train of symptoms." They would classify the purpuras as follows: (1) Essential purpura hæmorrhagica, including under this term morbus maculosus, morbus Werlhofii, purpura simplex, peliosis rheumatica, and purpura urticans. (2) "Symptomatic purpura," including all those cases which are met with in the course of the infective fevers, such as typhoid fever, variola, measles, scarlet fever, pest, yellow fever, sepsis, acute yellow atrophy, icterus gravis, etc. (3) "Cachectic," including forms found in pernicious anemia, leukemia, carcinoma, Bright's disease, etc. (4) Toxic purpuras, such as are met with in certain forms of poisoning, snake-bite, phosphorus, copaiba, antipyrin, etc. (5) That form found in "disseminated sarcomatosis, in one case of which there was actual sarcomatous invasion of the internal coat of the vessels, and in another, emboli of sarcoma cells." The first two groups, and possibly the third, would fall under the head of infectious purpura.

E. Becker,¹ in discussing the cases of typhoid fever in which he has made blood examinations, states that he regularly found a **leukopenia** which usually disappeared at once upon the establishment of convalescence. On the day following the disappearance of fever, or about that time, the lymphocytes rose very rapidly to as high as 59% of the total number; the eosinophiles disappeared during the course of fever and appeared again the day after the disappearance of fever. Eosinophiles, however, are not an absolute indication of the prognosis, since they reappeared in one case shortly before the appearance of fatal nephritis and pneumonia. He describes cases to show the importance of leukopenia in diagnosis between typhoid and pneumonia.

Thayer² reports the result of the **examination of the blood in typhoid fever**, made in the Johns Hopkins Hospital during the last 11 years. In regard to the quantitative and qualitative changes of the red blood-corpuscles, the work confirms that of previous investigators; *i. e.*, that there is an anemia—the loss rarely exceeding 1,000,000 red cells to the cubic millimeter—which bears a close relation to the severity of the disease, and that the loss of coloring matter in a general way parallels that of the red cells. Thayer's results show "a progressive diminution of the polymorphonuclear neutrophiles with a corresponding augmentation in the mononuclear forms." Transient leukocytosis occurs after cold baths. Leukopenia is the rule in uncomplicated cases of typhoid fever, and leukocytosis with hemorrhage and perforation, and especially in connection with large abscesses, phlebitis, peritonitis, pleurisy, pneumonia, periostitis, cystitis, and cholecystitis.

Waldvogel³ contributes a paper of interest concerning the condition of the **freezing-point of the blood** in typhoid fever. He used in his investigations a clinical method described by Dreser. It consists

¹ Deut. med. Woch., Sept. 6, 1900.

² Med. News, Dec. 1, 1900, from Jour. Boston Soc. Med. Sci., Oct. 16, 1900.

³ Deut. med. Woch., Nov. 15, 1900.

in the use of a wide test-tube, which is placed in the freezing mixture, and into which is introduced a narrower test-tube containing the fluid to be tested and also a narrow thermometer graduated to one one-hundredth of a degree Centigrade. Five cc. of fluid was sufficient. The blood was obtained from an arm vein by means of a cannula. It was allowed to stand on the ice for about 48 hours, the serum then pressed out and used in the test. He found that the most striking point in his investigations was that the serum of convalescents showed very high values, while that of the fatal cases was very low. One patient, who is still living, but in very bad condition, also showed a very low freezing-point. This increase of the freezing-point could not, in Waldvogel's belief, be attributed to uremia. The investigations for urinary albumin and casts, and the mental condition of the patients, spoke strongly against this, as did the coincident examinations of the freezing-point, the total amount of urine, and the amount of sodium chlorid and total nitrogen contained therein. The renal function seemed to be normally carried out. There was no definite relation between the strength of the agglutination reaction and the values for freezing-point of the blood-serum. The investigations of the alkalinity of the blood, the amount of nitrogen contained therein, and the sodium chlorid showed only that the alkalinity was not reduced and that the sodium chlorid was not increased; hence the increase in the reduction of the freezing-point was not attributed to increase in the amount of salts; but there was some evidence of increase in the amount of nitrogen, indicating that the albuminous constituents of the serum were increased. It is also observed that in producing diphtheria antitoxin the albuminous constituents of the blood-serum increase. Waldvogel suggests that it is possible that the increase in the reduction of the freezing-point in typhoid fever, therefore, indicates an increase in the antitoxins in the blood; but he admits that there is no definite reason for considering this true as yet.

Rumpel¹ offers a criticism of Waldvogel's results concerning the freezing-point of the blood in cases of typhoid fever. He carried out similar investigations and found that in 11 cases of typhoid fever of varying degrees of severity the freezing-point of the blood was normal. It is readily possible by errors in technic to cause serious errors in this method of investigation. [It is well known that the methods in use are more or less inaccurate.]

A. Hoffmann,² in discussing typhoidal meningitis, describes a case, which occurred in a man of 24, in which there was a history of violent headache in the early part of the attack. The man was admitted in the third week, and had marked nervous symptoms, which soon decreased largely, but a few days later came on again with the signs of relapse and with severe vomiting. There was again an improvement in the symptoms, but afterward severe delirium with stupor and marked tremor. The fever again disappeared, and the patient became much improved. There was finally a sudden onset of severe

¹ Münch. med. Woch., Jan. 29, 1901.

² Deut. med. Woch., July 12, 1900.

clonic convulsions, which continued for 6 hours, until death occurred in coma. The appearance of the brain upon postmortem examination was normal excepting for some edema. The microscope showed round-cell infiltration of the membranes, and a collection of round cells in the subarachnoid space and about the vessels, with a few typhoid bacilli in the pia and subarachnoid space. In the absence of evidence that there was any uremia in the case, meningitis had been diagnosed during life. In discussing the question whether such symptoms are produced by the action of the typhoid bacilli or by the typhoid toxin, Hoffmann states that he is convinced that the toxin is the cause. He thinks that the difference between mild nervous symptoms and such severe ones as were seen in this case are only quantitative and dependent upon different amounts of toxin. Typhoid bacilli are frequently found to be absent when severe nervous symptoms are present, and in such cases the toxin must have caused the symptoms; even though typhoid bacilli are sometimes found, it is almost always only in severe cases, and this merely indicates that toxins have a more rapid and violent action when they are produced in the meninges. [We have repeatedly observed violent meningeal symptoms that have gradually subsided, not only in typhoid fever, but in pneumonia and scarlet fever as well. Some of these cases are doubtless instances of actual meningitis; others are probably wholly toxic. It is of interest to recall the fact that meningitis may exist without macroscopically discernible lesions. Microscopic examinations must be made in every case.]

Deiters¹ reports the cases of 2 children of the same parents who had hereditary tendency to psychic disturbance, both of whom in the initial stages of typhoid fever showed **marked mental changes**. In the first case there was a marked delirium in the early stages, which rapidly disappeared. In the second case there was a maniacal state, which was followed by delirium and fever, and subsequently by somnolence. One of the cases showed no physical signs of typhoid fever, and the disease was diagnosed practically solely upon the positive result of the Widal reaction. Deiters believes that with acute psychosis associated with fever one should always think of typhoid fever; he considers also that the initial delirium of typhoid fever may progress for some time without actual rise of temperature, and physical signs of the disease may appear late in the course of the disease. [In connection with this paper that of Fraenkel, already quoted, is important.]

Carlsaw² reports 2 cases of **paralysis after typhoid fever**. In one case the palsy was due to peripheral neuritis, in the other case there was an attack of hemiplegia in the course of the disease. Cases of hemiplegia have been recorded by Murchison and others, and may be due to embolism or thrombosis, such as also occurs in the peripheral vessels. Other cases of paralysis may be due to inflammatory lesions or areas of softening. Most frequently the posttyphoidal paralyses are occasioned by neuritis. This may be a very slight affection, such as frequently occasions "tender toes," or it may be very extensive and cause

¹ Münch. med. Woch., 1900, No. 47.

² Glasgow Med. Jour., Mar., 1900.

atrophy with motor and sensory disturbances. One of the cases described is of this character.

J. W. Springthorpe¹ reports a case of typhoid fever in which **paralysis of the peroneal muscles** occurred. The patient, during the campaign in South Africa, had been wearing a tight puttee, and it was thought that this had probably pressed upon the anterior tibial nerve as it wound about the head of the fibula. He believes, however, that the toxin in typhoid fever should be considered responsible for the onset of the neuritis, the pressure acting merely as a determining factor.

W. Osler² insists upon the fact that **perforation and perforative peritonitis** in typhoid fever do not, in a very large percentage of cases, present the symptoms which are commonly described as characteristic of these conditions. He considers that surgical treatment would save many of these cases if the diagnosis were made early after the accident, but there is as yet far too little known about the diagnosis of perforation in typhoid fever. He insists that in cases in which this accident is feared a skilled diagnostician should be in attendance, and if the diagnosis is made a surgeon should be called in at once. The accident should be feared in severe cases during the height of the disease. He has found it more common when there is diarrhea and tympanites, two-thirds of the 30 cases seen at Johns Hopkins Hospital having had diarrhea. In 6 of the 20 cases there were both perforation and hemorrhage; these two accidents are not infrequently associated with each other. Perforation should always be carefully watched for if there are any marked abdominal symptoms. There should be special notes made of pain in the abdomen, particularly if it is severe and of acute onset, and if it tends to grow worse. A localization of the pain in the region of the right iliac fossa is of much importance. There should be notes made of the condition of the abdomen, stating whether it is flat, scaphoid, or distended, and if distended, whether uniformly so, and also whether respiratory movements are present over the abdomen and are uniform laterally and above and below. One should look for tension, pain on palpation, and muscular rigidity or spasm, particularly in the epigastric and right iliac regions. The liver dullness should be carefully observed in the axillary and nipple and middle lines. Blood and sloughs should be looked for in the stools, and there should be a note of any change in the character of the stools. The general condition of the patient should be watched, any change in expression noted, also any increase in the rapidity of the pulse or respiration, any shallowness or sighing in respiration, and any decided variation in the temperature. Sweats, vomiting, and hiccough are suspicious signs, and variations in the leukocyte-count should be looked for. The notes of 3 other cases are given by Osler, in which a diagnosis of perforation was made in the absence of typical symptoms. Operation was undertaken, and the diagnosis was confirmed. In the first instance the patient died, apparently not from the operation, but from the severity of the disease. In the second case there was intense swelling and infil-

¹ Lancet, Nov. 3, 1900.

² Phila. Med. Jour., Jan. 19, 1901.

tration of the walls of the gut about the perforation, sutures would not hold, and the patient died on the table. Recovery was secured in the third case. Osler mentions the record of 16 cases which had been operated upon, with 6 recoveries; in the last series of 11 cases there have been 5 recoveries.

Russell,¹ after a detailed report of 6 typhoid cases, with perforation or the symptoms and signs of perforation, with the **leukocyte-count**, and a tabulation of the leukocytic count in some of the complications of typhoid fever, concludes as follows: "(1) That in perforation it is the general rule to have a leukocytosis, but that the degree may vary within wide limits; (2) that the leukocytes, while appearing as a rule early, may not be at all marked until the general peritonitis and collapse have supervened; (3) that there may be an utter absence of leukocytosis, with marked perforation and peritonitis; in fact, that the cells may be lower than normal; (4) that with typical signs of perforation and a definite leukocytosis there may be no such complication present, and an operation may be performed unnecessarily; (5) that a marked degree of leukocytosis may occur in complications other than perforation; for example, bronchitis, cholecystitis, etc.; (6) that with pain and tenderness in the abdomen coming on suddenly during an attack of typhoid fever (and in the absence of evidences of cholecystitis or other definite complication) and a distinct leukocytosis, even without other signs of perforation, and exploratory operation is justified, even advisable, thereby obviating the dangers of a fatal issue from too great a delay."

Mannini² discusses **peritonitis** and typhoid fever due to infection from the intestine **without perforation**. He directs attention to the fact that in typhoid fever the intestinal epithelium has lost much of its protective power, that the lymphatic apparatus is inflamed, and that bacteria evidently pass the intestine, as they are found in the spleen, the liver, the kidneys, and elsewhere. It is rather remarkable under these circumstances that peritonitis does not occur very frequently, as the bacteria undoubtedly reach the peritoneum also. The explanation of the infrequency of peritonitis is to be found in the fact that the peritoneum absorbs very freely and gets rid of the bacteria in this way, and also the peritoneal fluid and the leukocytes contained therein have a strong bactericidal action upon various microorganisms, including the typhoid bacillus. In a certain number of cases, however, peritonitis does occur without perforation, and must in such cases be attributed to diffusion of the bacteria through the intestinal wall, the occurrence of peritonitis being due to loss of the normal resisting power of the peritoneum. The only point distinguishing this form of peritonitis from perforative peritonitis is the fact that in the latter air may usually be shown to be present in the peritoneal cavity. The prognosis, however, is better, and surgical measures should not often be adopted.

C. Berland³ reports upon the condition of the heart in 265

¹ Boston M. and S. Jour., Apr. 18, 1901.

² La Riforma Med., 1900, Nos. 210 and 213.

³ Lancet, July 28, 1900.

patients convalescing from enteric fever, who were under his care on an army transport running to England from South Africa. The pulse-rate was about 80 in 56 % ; it was as high as 95 in 25 % , 100 in 10 % , 110 in 5 % , and between 120 and 140 in 4 % . On the contrary, the pulse averaged from 72 to 80 in 50 patients who were convalescing from dysentery. Berland attributes the tachycardia in typhoid fever to the previous debility from which most of these patients had suffered, and to the long course of the disease following this. In some cases in which previous debility had not been present tachycardia was not seen.

G. Ogilvie¹ describes 4 cases in which typhoid fever was complicated by jaundice. His study of the literature shows that this complication is met with in 1 % of cases, or perhaps a fraction more. It seems, therefore, to be not so rare as is commonly stated, and it certainly is not so fatal a complication as it is usually thought to be. If it appears early and is prolonged throughout the whole or the greater part of the disease, it is likely to be of evil omen, and Ogilvie doubts the correctness of some reports of jaundice complicating practically the whole course of the disease when the general course of the affection was not an unfavorable one. He thinks that in such cases the diagnosis of typhoid fever is often open to doubt. Milder and less prolonged attacks of jaundice, with a favorable outcome of the affection, are more commonly seen. The main points of the 4 cases which he describes were as follows : The first occurred in a man of 22, and it began with the onset of the disease and disappeared as the fever began to decline, but persisted in milder form throughout convalescence. The second patient, a man of 30, showed jaundice at the end of the first week ; the icterus persisted about 6 weeks, throughout the whole course of the disease. The third case, also a man of about 30, had jaundice for some time before the onset of the typhoid fever, and the jaundice persisted for about 3 weeks after typhoid appeared. In this case the jaundice had no relation to the attack of typhoid fever, but merely complicated it. In the fourth case, that of a girl of 16, lumbricoid worms were passed during the attack, and the jaundice was apparently due to the worms, and was not directly related to the typhoid fever. The cause of the jaundice in the first 2 cases was uncertain. Ogilvie believed that it was not a catarrhal jaundice ; it was more probable that, as suggested by DaCosta, there was some direct action of the typhoid bacillus on the liver or bile channels.

E. Cassuto,² in discussing **abscess of the liver** following typhoid fever, states that this is rare in Europe, but more common in tropical countries. There are 2 chief varieties, one showing circumscribed collections of pus, usually single, resembling dysenteric suppurative hepatitis, and being accompanied by no ulcerogangrenous lesions of the intestine, no foci of pus near the intestine, and no appendiceal lesions, the typhoidal ulcers in these cases being usually advancing toward cicatrization. In the other class of cases there are small multiple foci, and these foci can usually be shown to be secondary to suppuration in some other part

¹ Brit. Med. Jour., Jan. 12, 1901.

² Gaz. Hebdom. de Méd. et de Chir., Jan. 6, 1901.

of the body. There may also be a periangioeholitis following ulceration of the bile-duct, or a diffuse peripylephlebitis. There are often in these cases gangrenous ulcers of the intestine, particularly about the appendix or in this structure. The affection may enter by the bile paths, by the arteries, or by the portal vein. In a multiple abscess the pus is fetid and the lesion gangrenous. In these cases the pus is likely to contain organisms other than the typhoid bacillus, perhaps associated with this bacillus. In single abscess the typhoid bacillus has been found present alone as well as associated with other organisms. The typhoid bacillus may cause suppuration in the liver, but seems to lose much of its virulence when it lodges in this organ. The symptoms of suppurative hepatitis in typhoid fever are about the same as those seen when this complication occurs in other conditions, and the diagnosis is often difficult to make. If an empyema is discovered, and particularly if it contains the typhoid bacillus, this should arouse suspicion of suppuration in the liver.

A. Prochaska¹ discusses **suppuration in typhoid fever**, as this complication has been observed in the past 3 years in Eichhorst's clinic. He was led to an investigation of the records by the observation of a case in which suppuration occurred in the gluteal muscles of a boy of 11 years during the course of typhoid fever. The abscess was opened, and typical typhoid bacilli were found in the pus. He found in 3 years the records of 21 other cases of suppuration during the course of typhoid fever or in the immediate convalescence from the disease. Apparently the one instance mentioned was the single one in which typhoid bacilli were found present. In most other cases staphylococci only were found. In 6 of the instances there was a mixed infection or an infection with bacteria other than staphylococci; in 2 cases streptococci were found with staphylococci, and in 2 cases streptococci alone. In 1 case of otitis media *Staphylococcus aureus* was found with virulent diphtheria bacilli. Prochaska thinks that the frequent occurrence of suppuration in the course of typhoid fever indicates that if micro-organisms are present in the body, the onset of typhoid fever causes them to take on increased virulence. The abscesses seen were usually deep, superficial skin abscesses occurring only rarely. In several cases there were multiple foci of suppuration. In only 1 case was there any evidence of severe constitutional involvement. Death occurred in this case from acute sepsis after the symptoms of the primary typhoid fever had practically disappeared. In the other cases the complication was recovered from in a relatively short time, and the occurrence of the complication was not associated with any marked rise of temperature unless the fever had already disappeared. The abscesses always occurred after prolonged rest in bed; hence he thinks that there was in no instance any opportunity for trauma to act as an etiologic factor. There were 4 cases of otitis media seen in 300 cases of typhoid fever.

Vincent² showed that in 2 cases of **laryngeal ulceration of typhoid fever** the infection was due to streptococcus, and not to the typhoid bacillus.

¹ Deut. med. Woch., Feb. 28, 1901.

² Wien. med. Woch., Nov. 3, 1900.

H. Conradi ¹ reports a case of **multiple periostitis** occurring 6 months after an attack of typhoid fever in a girl of 15. Bacilli isolated from the pus had all the characteristics of the typhoid bacilli and reacted in a dilution of 1 to 500 with the blood-serum of a rabbit which had been inoculated with typical typhoid bacilli. An interesting observation, however, was that these bacilli would not react with the blood-serum of the patient, a demonstration of the fact that the Widal reaction may not be present in metastatic posttyphoidal infection with the typhoid bacillus. The explanation for this may have been that the agglutinating power had been lost within the six months following the occurrence of typhoid fever, but more probably it was due to the loss of specificity in the typhoid bacilli themselves. Conradi thinks that such a loss of specific characteristics always takes place when typhoid bacilli produce local suppuration and not general infection. He does not think that these local suppurative lesions can be attributed to specific lack of resistance in special tissues, since typhoid fever as a general process is such a different disease from local suppuration. He thinks the true explanation to be that the bacilli have lost their general infective power, and have but little power of causing local lesions even; but they lodge in the tissues, and if trauma or other local damage reduce the resistance of the tissues, the bacilli gain a relative virulence and produce suppuration.

A. Schudmark and J. A. Vlachos ² report a case of typhoid fever followed by **suppuration of the thyroid gland**. The thyroid was somewhat enlarged at the commencement of the disease, and the enlargement increased, and there was ultimately an abscess of the gland. In this abscess they found the typhoid bacillus in pure culture. In the early course of the case a leukopenia existed, with relative increase of the lymphocytes. After suppuration had begun there was decided leukocytosis. A series of animal investigations which they carried out with a view to determining the pyogenic activity of the typhoid bacillus and the influence of the resulting suppuration on the number of leukocytes showed that the typhoid bacillus, excepting in very virulent form, will cause suppuration. The general systemic effects of very virulent bacilli were too rapid to give time for suppuration. When local suppuration is produced, a leukocytosis occurs. They consider the leukopenia in typhoid fever to be due to the localization of the disease in the organs which produce leukocytes, and not to be the result of a specific action of the typhoid toxin.

C. J. Whalen ³ describes 2 cases of **afebrile typhoid fever**, the first in a man of 23, who had general lassitude, constipation, epistaxis, splenic enlargement, and tenderness with positive diazo and Widal reactions; there was also an eruption of rose-spots. The temperature throughout 3 weeks' observation, taken 4 times daily, never went above 99°. Excessive indulgence in exercise and food produced in this case a typical relapse, with a typical temperature course. The second case

¹ Deut. med. Woch., Sept. 27, 1900. ² Wien. klin. Woch., July 19, 1900.

³ Jour. Am. Med. Assoc., Nov. 2, 1901.

was seen in a boy of 17, who had the usual symptoms of typhoid fever with absence of temperature; spots were present, and the diazo and Widal reactions were positive. He was observed for about 3 weeks, and the temperature was taken 4 times a day.

J. M. Atkinson¹ reports a case of typhoid fever, that occurred in a man of 25, in which 2 relapses appeared, and in which the whole duration of treatment in the hospital was 149 days. The man recovered entirely.

The Widal Reaction.—The value of this reaction as an aid to diagnosis is very great despite the fact that there are cases in which it fails, and more numerous instances in which its occurrence is so late that the diagnosis has been established in other ways. Proper dilution (1 to 50) and accurate technic are essential. Lower dilutions than that named may lead to error, because the serum in health or in other diseases sometimes causes agglutination and cessation of motility when the dilution is as low as 1 to 20 or 1 to 10. Delay in the appearance of the reaction may be due to a variety of causes. We have ourselves observed in repeated instances that complicating conditions, such as influenza, suppurations, and pneumonia, had such a deterrent effect. This question has been referred to in an article by Krous, which will be quoted below.

W. G. Savage² reports a series of 10 cases of typhoid fever in which **prolonged periodic examinations of the agglutinative properties of the blood-serum** were undertaken. His object was to determine whether the serum-reaction was of any importance in prognosis, and whether there was any relation between the serum-action and the presence of complications or relapses; also to determine whether the colon bacillus was more markedly agglutinated by the blood of typhoid fever patients than by others, and whether there is any peculiarity in the course of cases in which there is marked agglutination of the colon bacillus. His dilutions were carefully carried out. In 3 cases which were free from complications the maximum reaction appeared shortly after the temperature began to fall, and then the reaction decreased, excepting in 1 case, in which the maximum reaction appeared about a month after the temperature had reached normal. In 4 cases with a relapse the reaction was very slight soon after the appearance of the relapse. The same thing occurred in another case without relapse, however, and consequently the feebleness of the reaction did not seem necessarily to indicate relapse. The reaction was much diminished in some cases after hemorrhage. Savage considers that a diminution in the degree of immunity attained is not the only cause of relapse; there is probably also an increased virulence of the microorganisms. The reactions with the colon bacillus were undertaken with a number of different cultures of this organism; 11 out of 13 specimens of serum gave no reaction; one specimen gave a slight reaction at times; and another specimen gave 17 positive reactions in a dilution of 1 to 100, and 15 negative reactions. The organism, however, was probably one which

¹ Lancet, Sept. 3, 1900.

² Lancet, Nov. 17, 1900.

clumped readily. The serum from the same case showed decided difference in the reaction with different cultures of typhoid bacillus, but Savage does not consider that these results are sufficient to justify one in believing in the existence of distinct species.

Fiocca¹ discusses the **Widal reaction** in its relation to 160 cases of typhoid fever which he has examined in two Roman hospitals. He considers that this reaction is the most certain and practical method of diagnosis of typhoid fever which we as yet have. He found the reaction practically always present in cases of indubitable typhoid fever if several tests were carried out during the course of the disease, except in very severe cases which proved fatal; in several such it was absent. He does not believe that a true reaction is ever observed in other diseases if a dilution as great as 1 to 40 or 1 to 50 is used. He does not think that the reaction is of any value in prognosis.

A. Berliner and M. Cohn,² after studying the **Widal reaction** in 45 cases of typhoid fever, decide that it is of marked value in diagnosis. A suggestion which they make is to use a macroscopic method, which consists practically in carrying out the reaction in a shallow watch-glass. They state that at ordinary temperature a precipitate in the form of a star-like figure occurs after half an hour. They do not consider the Widal reaction of any importance in prognosis; and in their experience it is not influenced by complications. They report the occurrence of renal hemorrhage in 3 cases, in all of which the patients recovered, and in a number of cases they found small ulcers in the mouth which they thought were due to the typhoid bacillus.

Gillies³ analyzes 86 cases of typhoid fever admitted to the Royal Victoria Hospital, Montreal, during 1899. The **Widal test** was positive in all but 4 cases. In these it was negative throughout. Of these, 3 were regarded as abortive typhoid (?). No rose-spots were present. The mortality was 8.16 %; 3 deaths from hemorrhage, 2 from perforation, and 2 from profound intoxication. During the past 6 years 494 cases of typhoid fever have been treated at the Royal Victoria Hospital, with 25 deaths, giving the low average mortality of 5 %.

E. Kraus⁴ makes an important contribution concerning the **influence of pneumonia** upon the typhoid Widal reaction. He observed in one case in which the symptoms suggested typhoid fever, but were not typical, that the serum reaction was positive in 15 minutes in a dilution of 1 to 30. After 1 week the reaction in this dilution was negative. The patient died on the next day, and the necropsy showed that there was typhoid fever with pneumonia of the left lower lobe. Kraus thought it was possible that the second reaction was negative because of some influence exerted by the pneumonia. He found that if one took typhoid serum which gave a strongly positive reaction and added 30 drops of serum from a pneumonia case to 1 drop of the typhoid serum, the reaction was negative. He also found that a case of typical typhoid

¹ Il. Policlinico, Nov. 1, 1900.

² Münch. med. Woch., Sept. 11, 1900.

³ Am. Jour. Med. Sci., Oct., 1900, from Montreal Med. Jour., June, 1900.

⁴ Zeit. f. Heilk., Bd. XXI, H. 5.

which gave a constantly negative Widal reaction showed typhoid lesions with perforation of the intestine, but there was also croupous pneumonia of one lung. The conclusion that Kraus reaches is that there is a substance in pneumonia serum which prevents the reaction of typhoid bacilli if the substance is present in sufficient amount. If, then, a typhoid reaction has been obtained, but disappears, and the symptoms are still grave, this points to a complication.

The Diazo Reaction.—Burghart¹ contributes a study on the influence upon Ehrlich's diazo reaction exerted by substances of greater affinity for Ehrlich's reagent. Thus, tincture of opium, added to urine outside the body, gives a positive reaction. Tannic and gallic acid, tannalbin, tannigen, as well as uva ursi and other tannic acid preparations, after introduction into the gastrointestinal tract, may cause the disappearance of a previously positive diazo reaction. Iod. vasogen, as well as creosote and creosotal, has been found to possess this peculiarity. Burghart explains this by the fact that phenol occurring in the urine after the administration of creosote has a greater affinity for Ehrlich's reagent than the so-called Ehrlich's bodies. A number of colors, as yellow, red, brown, and green, as well as bilirubin and urobilin, can thus influence the diazo reaction. Phenol changes the red diazo hue into a yellow-red, or a pure yellow. When the presence of carbolie acid is suspected, it should be removed, though this is often very difficult. Burghart thinks that in the estimation of the value of the decrease or disappearance of the reaction, it should be remembered that the diazo reaction may not occur as a result of the administration of remedial agencies or of the presence of color stuffs, or because of an impermeability of the kidney, or in consequence of some change in metabolism, which, though usually of no significance, may even indicate a turn for the bad during the course of a disease.

Treatment.—The efforts at production of a specific remedial or prophylactic serum have thus far failed to warrant more than a feeling of hopefulness. The results obtained in the British army are encouraging, though not conclusive.

A. E. Wright² reports the results which he obtained in the use of antityphoid inoculations at Ladysmith. The use of inoculations seemed decidedly to protect against typhoid fever, only 2% of the 1705 men who were inoculated acquiring typhoid fever, while 13.2% of the 10,529 who were not inoculated fell ill with the disease. If typhoid fever appeared in the inoculated, the death-rate was about the same as in the uninoculated. The results seem to be encouraging so far as protection is concerned.

A. E. Wright³ gives a brief note on the results from antityphoid inoculation in the Fifteenth Hussars, carried out in India. Of those who were inoculated there was a morbidity of 0.55%, and a mortality of 0.27%. He contrasts this with the morbidity in the uninoculated, which was 6.14%, while the mortality in the uninoculated was 3.35%.

¹ Berlin. klin. Woch., Mar. 18, 1901.

² Lancet, July 14, 1900.

³ Brit. Med. Jour., Feb. 9, 1901.

H. Cayley,¹ in discussing the **value of inoculation against enteric fever**, gives a series of figures concerning the inoculation as carried out in the Red Cross hospital staff before entering service in South Africa, and also some figures concerning the results of the inoculation of soldiers. The first detachment of the hospital staff, consisting of 51 persons, were inoculated during the outward voyage, only 2 persons being excluded from inoculation because of previous attacks of typhoid fever. Two were inoculated only once, while the others received 2 doses, the second being given 10 days after the first. Decided local and constitutional symptoms occurred in from 2 to 10 hours after the inoculation, and in many instances the second inoculation caused as severe symptoms as the first. This, Cayley thinks, shows that immunity is not established within 10 days. The persons in this detachment of the hospital staff served for some months in stations where typhoid fever was rife, and all escaped the disease. The second detachment consisted of 82 persons, most of whom were inoculated, but many of whom were inoculated only once. Of the 36 nurses only 1 had typhoid fever, and she was the only nurse who had not been inoculated; 5 of the orderlies had typhoid fever, and 2 died. Of these 5, 2 had received but one inoculation, and 3 had not been inoculated. Of the 2 fatal cases, 1 had been inoculated once and one not at all. The third section consisted of 20 persons, all of whom were inoculated, and all of whom escaped typhoid fever. The blood of 23 members of the first detachment was examined 4 months after inoculation, and 21 gave a good reaction; the other 2, who had been inoculated but once, gave a slight reaction. Of the second detachment, 22 were investigated for the Widal reaction after 3 months; of these, 11 gave no reaction, 9 only a slight reaction, and but 2 gave a good reaction. It was evident that the inoculations of the first detachment were much more effective than those of the second. The reasons for this were not quite clear, but the material used for the first detachment was much fresher, and had been more carefully preserved, and it was probably for this reason that the results were so much better. Cayley thinks that these results with the hospital staff show a decided protective power, but indicate the necessity for 2 inoculations. He mentions 92 cases of typhoid fever in soldiers, among which there were 15 instances of the disease in persons who said that they had been inoculated. The 11 fatal cases included 1 person who had been inoculated once. Cayley does not believe that the statistics from inoculation of soldiers can be of much value, as the details could not be sufficiently worked out; but he does believe that the attacks of typhoid fever in those who had been inoculated were milder, and that the disease was of shorter duration.

H. Eichhorst,² after his **investigations of typhoid serum** prepared in the institute at Berne after the same manner as diphtheria serum, decided that the only effect to be seen was a slight increase in the fever without any change in the general symptoms or in the local signs found in the abdomen. Ley's **antityphus extract** was used in 12 cases

¹ Brit. Med. Jour., Jan. 12, 1901.

² Therap. Monatshefte, Oct., 1900.

which were in extremely bad general condition. Not one of these patients died. In 1 case the fever disappeared entirely after 7 days' use of the remedy; in the other cases after 4 or 5 days' use. There was said to be marked general improvement, the stupidity disappeared, and the spleen gradually decreased in size. In 2 cases relapses occurred, which were of short duration; the same remedy was used in the relapses with good results. The remedy is, however, an expensive one, costing in Zürich \$8 to \$10 for the amount used with each patient. Eichhorst recommends the use of warm or lukewarm baths in typhoid fever at least once or twice a day, even if cold baths are used at the same time.

Feeding in Typhoid Fever.—There is a tendency in certain quarters to return to a more substantial diet than has been customary, and various arguments are advanced to justify this procedure, without, as far as we can see, sufficient foundation. Our own view is so positive that milk alone, when this can possibly be taken by the patient, is the proper food, that we shall view with distrust any contrary opinion not founded upon the soundest arguments and the widest experience. The administration of semisolid or solid food seems to us little short of hazardous.

J. Barr,¹ in a discussion of the treatment of typhoid fever, states that he often gives peptonized bread and milk and liquid food preparations, and also butter and cream, during the course of the disease, and he insists that the **diet should be fluid**. He recommends that the bowel movements be observed daily, and if the bowels appear to be at all loaded, if the abdomen be distended, and the urine contain a notable amount of indican, a gentle laxative should be given and the diet should be diminished. He states that any case of typhoid fever can be better treated without alcohol than with it. Under antipyretic treatment he discusses the use of the continuous bath, which he says he has repeatedly used with advantage; but he has lately substituted for this a method which consists in having the patient swung in a hammock, and allowing a small stream of tepid water to play constantly over the abdomen. He has found this to be very successful in very severe cases. He also thinks it is an excellent plan to administer once or twice daily cold water enemas of about a pint and a half, containing an antiseptic, like permanganate of potassium or peroxid of hydrogen; this, he thinks, serves to cleanse the large bowel of decomposing matter. [The author makes a number of questionable statements which have an element of truth, but to our mind more of fallacy in them. Some cases of typhoid fever are undoubtedly better managed when some alcohol is given, though the routine use of this drug is unnecessary and often harmful. With regard to colonic lavage with antiseptic solutions, we fail to see the reasons upon which he bases his treatment. There is nothing in the known pathology of the disease to indicate that septic processes or septic absorption occur in the large bowel except when the lesions are located there, which is unusual.]

D. Inglis² inveighs against the use of milk diet in typhoid fever,

¹ *Lancet*, Sept. 29, 1900.

² *Phila. Med. Jour.*, Feb. 9, 1901.

and apparently recommends **pure water diet**. He considers that food merely acts as a culture medium for bacteria, and that patients with typhoid fever are not in a condition to digest or absorb food.

G. W. Moorehouse,¹ in discussing the methods of feeding in typhoid fever, advocates that **freer diet should be used**. He bases his paper upon a series of 150 cases which occurred within 17 months. The statistics are not extremely convincing of the value of freer feeding. In 84 of the cases the decline of fever was apparently uninfluenced by the food, while in 11 cases it seemed to be hastened. In 13 cases, however, when feeding was begun before the temperature reached normal, an irregular fever followed, which appeared to be a relapse. In 21 cases a so-called "relapse-like rise of temperature" was observed. In the cases in which feeding was begun directly after the temperature reached normal, 5 showed irregularities in the temperature, while 39 showed no subsequent rise.

F. L. Keays,² in reporting upon the treatment of typhoid fever at the New York Hospital, states that under one chief the **tub bath is given at a temperature of 65° when the temperature passes 102.6°**. Other chiefs bathe at 103° with the bath at first at 80° and afterward at 70°. These are not hard-and-fast rules. In cases in which the bath is contraindicated ice-cold alcohol sponges are given. Sometimes a modification which has been found useful is instituted; this consists of having one attendant sprinkle the patient's body with alcohol by means of a whisk-broom and another fanning him to hasten evaporation. The antipyretics are used in small doses if the tub bath does not seem to be effectual, and in some cases when the baths cannot be used, as when open wounds are present. Milk is given in quantities of from 50 to 70 ounces in the 24 hours, care being taken to keep the amount up to this. Other foods are given if the milk does not agree well or is not well taken, though nothing but liquid food is allowed until the temperature reaches normal, when at once a lamb chop, or an egg boiled for twenty minutes, and finely chopped or scraped beef sandwiches are given, and the food is rapidly increased in amount and variety. Calomel and saline purgatives are given in the first week if there is constipation. After this no purgatives are given. Diarrhea is treated by a large enema if there is any possibility of fecal impaction; if not, mild astringents are given. Distention is managed by the use of turpentine. In pneumonia the tub bath is continued unless the patient's condition indicates that it is immediately dangerous.

C. H. Anderson³ reports that he used **transfusion with a normal salt solution** in 5 cases of enteric hemorrhage in typhoid fever. He describes at length 1 case in which severe hemorrhage occurred, and on several occasions almost proved fatal. In each instance the hemorrhage was treated by a large dose of strychnia and the free injection of normal salt solution into a vein. After a most profound illness the man recovered entirely.

¹ Boston M. and S. Jour., Nov. 15, 1900.

² Med. Rec., Dec. 1, 1900.

³ Medicine, Sept., 1900.

J. M. Anders,¹ in discussing the treatment of gastrointestinal symptoms in typhoid fever, insists that the **use of drugs is of minor importance**, while attention to the feeding, to the proper use of stimulants, and to the bathing and nursing will often obviate any necessity for the use of drugs. He insists that the nourishment should be always fluid, and if milk is well borne this should be the chief article of diet. Proper attention to the amount and character of the food will often relieve or thoroughly control gastrointestinal symptoms, and he considers that the bath treatment favorably influences these symptoms. He considers that specific antiseptic treatment is wholly useless, but believes that some antiseptics, such as salol, control the fermentative process in the intestine to some extent. He thinks that in some cases intestinal irrigation may be properly used if undertaken with care.

Drugs are admitted by nearly all authorities to have but a secondary importance in the treatment of typhoid fever. Various complications may doubtless be obviated or rendered less dangerous by the use of drugs, but the disease in itself is little influenced. Antipyretics have been universally condemned, though each new synthetic compound finds a hopeful investigator and a temporary vogue. The same may be said of "intestinal antiseptics."

W. Ewart,² in discussing the treatment of typhoid fever, states that stagnation of the feces and their putrefaction is particularly dangerous when they are more or less liquid; hence he believes in the **use of mild astringents**. He has found that fullness and tension, as well as marked dullness in the right iliac fossa, may be relieved by turning the patient for a time on the left side. He considers the best medication to consist in the use of mercuric chlorid and calcium chlorid throughout the attack.

T. V. Hubbard³ describes a series of 20 cases of typhoid fever which he treated by an **antiseptic and eliminative method** which consisted of frequent doses of calomel, guaiacol carbonate, and podophyllin. After the bowels have been moved 4 or 5 times on 2 consecutive days, the calomel is stopped and menthol is given; and if constipation occurs afterward, he administers purgative salts. He believes that they help to aid in the elimination of poisons. [We have frequently observed the beneficial effects of mild purgation in the earlier stages and even throughout the course of typhoid fever. It may be recalled that calomel was highly lauded by Liebermeister and other German authors a number of years ago and was credited with great efficacy as an abortive.]

D. Parker⁴ reports some **observations upon 120 cases of typhoid fever** occurring in the British army in South Africa. There was a very striking difference in the virulence of the disease when it was acquired in different districts, Modder River, Norval's Point, Rensburg, and Arundel furnishing extremely severe cases. The earlier cases were always less severe than those that occurred later, but the most severe

¹ Jour. Am. Med. Assoc., Jan. 26, 1901.

³ Med. News, July 21, 1900.

² Lancet, Dec. 8, 1900.

⁴ Lancet, Aug. 25, 1900.

cases were much worse than any that Parker had ever seen in England. In treating these cases he used 5-minim doses of carbolic acid 3 times a day, and thinks that the results were extremely satisfactory excepting in relation to hemorrhage, which occurred in 10%. As a stimulant he found brandy much more useful than strychnia, the latter increasing any tendency to restlessness. He considers the results from transfusion in hemorrhage very valuable. As to the effect of inoculation, he found that the death-rate among the inoculated was 2.3% lower than in the uninoculated. The average temperature during the first 10 days was 0.9% lower, but the temperature reached normal only 5.4 days longer than the average uninoculated. Thirty-nine cases which he treated were inoculated. The results, then, while fairly good, were not striking. He has found that it is common in the histories of soldiers who are frequently subjected to typhoid fever to give a story of previous attack of the disease, and he does not think that repetition of the disease is uncommon.

A. B. Shimer¹ describes the effect which is obtained from the use of **thermol** in typhoid fever. He reports very rapid reduction of the temperature to normal, a quick subsidence of the symptoms in cases that had all the clinical appearances of typhoid fever, including a positive Widal reaction. He saw no unfavorable effects.

J. M. Peck,² in discussing the **treatment of typhoid fever**, reports 77 cases, in all of which the patients recovered. The most notable point in treatment was the use of acetanilid in small doses, and sponge or plunge baths. He considers chlorin useful as an intestinal antiseptic, and advocates calomel purges and lavage of the lower bowel.

Overlach³ claims that **eupyrin**, a drug which he has had prepared, and which is vanillin-ethylcarbonate-p-phenetidin, is a useful mild antipyretic which may be safely used in children and in the aged, and in febrile cases in which there is marked weakness, since it is stimulating rather than depressing. He states that the stimulating effect is so notable that patients if weary often incline to take the drug merely as a stimulant if they have previously been given it. He made spectroscopic examination of the blood of animals after large doses of eupyrin, and found that it produced no spectrum of methemoglobin unless given in very large doses, and then the spectrum was weak, being strongly in contrast in this way to phenacetin, which readily produced strong methemoglobin bands.

Winterberg⁴ describes the effects of **acetopyrin**, a new antipyretic. It is a powder which is easily soluble in warm water or in alcohol. He considers it a valuable antipyretic, without any unfavorable collateral effects. He also found it to be useful in rheumatism, considering it even better than the salicylates. It causes no disturbance of the stomach or circulation.

¹ Phila. Med. Jour., Jan. 19, 1901.

² Jour. Am. Med. Assoc., Feb. 2, 1901.

³ Centralbl. f. innere Med., Nov. 10, 1900.

⁴ Wien. klin. Woch., 1900, No. 39.

MALARIAL FEVER.

General Consideration.—The relation of the malarial parasite to the various forms of malarial fever is absolutely established, as is also the role of the mosquito as a carrier. Some doubt still exists as to the varieties of the parasites, and further investigation is needed to determine with certainty that the mosquito is the sole means of transmission of the infection, though the indications strongly suggest an affirmative answer.

R. Koch ¹ gives a general review of his work on the **malaria expedition**. In discussing the kind of parasites found, he states that beside the tertian and the quartan, but one variety was discovered, which was usually of ring form, sometimes of half-moon shape. It caused febrile attacks of a distinctly tertian type, though the type became irregular if influenced by quinin. He thinks that this is the same parasite that has been described as being found in other regions, and called the estivoautumnal parasite, but he prefers to call it the parasite of tropical fever. He insists that adults showed distinct immunity to malaria, which he considers an acquired immunity, since in several places the children investigated showed clinical signs of malaria or the presence of the parasite in very large percentage, the percentage decreasing with the age of the children. He believes that this does not, as Glogner believes, indicate that the adults are still susceptible, but the children excessively susceptible, because tropical malaria is a dangerous disease, and did the children show a greater susceptibility than adults, it would certainly cause a much higher death-rate among them. His method of examining the blood was to make smears and wave them quickly to and fro in order to dry them, which is often difficult in the very moist tropical atmosphere. They were then placed in a box which was covered with blotting paper, and then put in a glass vessel which contained calcium chlorid and was well stoppered. This was done to prevent the spoiling of the preparation by the moist atmosphere. He fixed by holding the cover-glass in the fingers over a flame and then placing 20 minutes in absolute alcohol. He used a borax methylene-blue stain. Further proof that a certain degree of acquired immunity is observed in adults was, he believes, shown by the fact that it is customary for attacks to become milder and milder as time passes; merchants, for instance, like to employ clerks who have had attacks years before. He also describes instances in which hemoglobinuric fever occurred, but was followed by occasional mild attacks. The latent form of malaria in which there are no outspoken attacks, but in which there is infection with parasites, is of great importance in considering the prophylaxis of the disease. Koch has been unable to find the parasite in any host except man and the mosquito, and he believes that these are the only hosts. He recommends once again with great emphasis his general quinin-prophylaxis for the purpose of stamping out the disease, and refers to tables to show the decrease of the disease in North Germany since quinin has been freely

¹ Deut. med. Woch., Dec. 6 and 13, 1900.

used. In order to carry out this method properly it is necessary to have a corps of doctors who are accustomed to examining for malarial parasites, and quinin should be given to all those who show any signs of infection. If this cannot be done, the temperature is taken regularly so far as possible, and if fever exists, quinin should be administered. The only drug which he considers comparable to quinin in its effects is methylene-blue. It works more slowly, but if quinin cannot be given, or if there is a tendency to blackwater fever, methylene-blue should be tried. As to quinin, he recommends only the hydrochlorate, and prefers that it should be given in the form of oblates or in solution, and best with dilute hydrochloric acid on an empty stomach. One should give not less than 15 grains, and it should be administered 4 or 6 hours before the attack and repeated the next day in the same dose; or, if the attack is not aborted, in a larger dose. If the temperature does not disappear, but the parasites are absent from the blood, one should look for complications. This general plan of treatment was carried out in over 500 severe cases and none were lost. **To prevent the recurrence of malaria** Koch recommends the use of quinin on 2 successive days, with a subsequent interval of from 7 to 11 days, then a repetition of the dosage on 2 days. Treatment should be continued for at least 2 months in these cases. He states that in patients who have any tendency to blackwater fever, or in which one suspects such a tendency, the beginning dose of quinin should be not more than $1\frac{1}{2}$ grains, which is doubled on the next day, and so on, but with careful observation of the temperature and of the urine. If there is a slight rise of temperature after the use of quinin, or if the urine appears darker and there is slight icteric color of the skin, one should go no further with the quinin or should reduce the dose, as these are the early signs of blackwater fever.

H. Ziemann¹ presents an interesting article on his observations concerning **malaria on the west coast of Africa**. After describing the climatic conditions in the regions where he worked, he discusses the fever type found in these cases, and states that in general it was malignant tertian, but that, contrary to the statement of Koch, he is convinced that irregular, remittent, and continued fever is observed in tropical malaria, even in patients who have not previously taken quinin. The parasite found in these cases is the same as the estivoautumnal of the Italian in most appearances, but is decidedly smaller and the segmentation form is also smaller. He does, however, think that the tropical tertian is decidedly different from the ordinary tertian. Clinically he describes a number of cases in which the temperature scarcely rose at all, and others in which there was only general disturbance with severe depression and without fever, all these cases giving way to quinin and being in his belief due to persistence in the internal organs of malarial parasites. In 2 negro children with enlarged spleens, who had had repeated attacks of malaria, he carried out splenic puncture, but was able to find only a few half-moon forms. The basophile granules which Plehn suspected of being the germs of parasites, and of producing relapses, he considers to

¹ Deut. med. Woch., Nov. 22 and 29, 1900.

be mere degeneration appearances. He was able to confirm the results of MacCallam and others concerning the sexual forms of the parasite. Concerning the clinical aspect of the cases, he considers prognosis good if treatment is undertaken early enough and is energetic. He lost but 2 patients from simple malaria; one of these was moribund when first seen, the other was comatose and in severe convulsions, and in the latter the brain capillaries were found filled with tropical parasites. Besides the tropical parasites, he observed tertians, but no quartans. The tertians were seen in Kamerun in only 1.1 % of the cases. By looking for splenic tumor and for evidences of parasites in the blood he reached the conclusion that 23 % of adults and children showed evidences of malarial infection in Kamerun, and that over 37 % of children under 5 showed the same signs. Of the Bulis examined, about 75 % of the captured women showed signs of the disease and practically all the children. Of the negroes of Togo, 38 % showed signs of infection. He thinks this is sufficient evidence that the natives are not immune to malaria, and at most they show merely an increased resistance to the disease. He has often observed in whites that while in the beginning they were apparently ready subjects of the disease, they often acquired a relative resistance. One man, for instance, had had innumerable attacks of fever and 13 attacks of hemoglobinuric fever, and he now has every few months an attack which is very mild; the merchants also like to employ clerks who have had fever in the first year of their arrival in Africa. Others who have been in Africa for as long as 23 years, and who have had good health or but slight fever, not infrequently die of tropical fever. The negroes usually recover spontaneously. It has been observed that there was a marked leukocytosis in negroes with malaria, and this perhaps has some relation to their spontaneous recovery. In making attempts to inoculate 7 persons with tropical parasites, he was successful in 6, the incubation period being from 10 to 12 days. This is further evidence that these negroes had not complete immunity. He was unable to find any regions which were free from malaria. In treatment he considers that quinin is the sovereign remedy. If patients are too sensitive to quinin, euchinin can be used successfully. Phenocoll and methylene-blue he considers practically useless. Quinin should be used during the intermission, 5 or 6 hours before the new attack; the highest dose necessary in a day is about 30 grains. Quinin should be given even though the temperature does not rise more than a degree or so, particularly in first attacks, as in the first attack the temperature often rises but little. As to prophylaxis with quinin, he considers that about 7 grains should be given every fourth day, and that this will either prevent the onset of malaria altogether or will make any attack mild and easily controlled. There should be careful hygiene of the dwellings, and the clothing and food should be well chosen. Persons sent to the tropics should be in good health, at least 25 years old; if applicants show any history of a tendency to malarial attacks they should be excluded from service in the tropics. He found in Kamerun, Victoria, and Togo specimens of *Anopheles* which showed infection with malarial parasites; he therefore

considers that the mosquito is certainly active along the west coast in carrying the disease. There should be care used to have one's self well covered with mosquito netting at night, and the room should be well lighted and well aired so that the mosquitos may not collect in them. The mosquito in pools, etc., along the coast can often be killed by turning the sea water into these collections of fresh water. Drinking water should be kept well covered, the ground should be well drained, and he believes that petroleum can be used with limited but marked success in preventing the development of the larvas. As to the use of quinin for general prophylactic purposes, he believes that this is an impossibility. Very much can be done to stamp out and prevent malaria by the use of quinin in the more intelligent classes, but it is impossible to carry out general quinin prophylaxis in the unintelligent, and particularly in a very large proportion of the tropical negroes.

Sambon,¹ in discussing the intermittent fevers, holds that the **terms malaria and malarial fever should be discarded** and the ancient term intermittent fever substituted. While the name malaria does, as he says, rest upon a false belief, it has the advantage over the term intermittent fever, not being applicable to only one form or group of diseases; still, on the other hand, there are intermittent fevers in no way connected with the disease under consideration. In a brief review of the important features of the malarial organisms, he includes a description of a parasite of quotidian fever. This organism was first described by Marchiafava and Celli, and while it is similar to that of estivo-autumnal fever, may be distinguished by its smaller size, less active movements, and shorter life cycle. The Italian observer named found that this organism occasionally reached the stage of segmentation without producing granules. Grassi and Feletti distinguished two kinds of quotidian parasites, the pigmented and the unpigmented, called, respectively, *Hæmamoeba precox* and *Hæmamoeba immaculata*. Bignami and Marchoux found it the prevalent variety in Senegal. Knowledge of this parasite, according to Sambon, is still very imperfect, and especially on account of the usual association of the estivoautumnal parasite. Therefore, according to Sambon, it is impossible at the present time to state anything positively concerning these quotidian parasites.

Patrick Manson² contributes an interesting review of existing knowledge regarding the **etiology, prophylaxis, and treatment** of malaria. Referring first to the relations of the mosquito, he states that the mosquitos of the genus *Anopheles* are efficient hosts of the malarial parasite. The organism does not develop beyond the earliest stages when introduced into mosquitos of the genus *Culex*. About 30 species of *Anopheles* have been described in different parts of the world. The conditions favorable to the multiplication of malarial mosquitos are: first, high atmospheric temperature from 75° to 104° F.; second, collections of water more or less fresh (not over 2 parts of sea water to 1 of fresh water), undisturbed by currents or winds, and persisting long enough to allow evolution of the insect from the egg; third, the presence

¹ Practitioner, Mar., 1901.

² Practitioner, Mar., 1901.

of low animal and vegetable life in these pools. The egg of the mosquito deposited on still water floats or becomes attached to vegetation. In a few days minute larvas are hatched. These feed greedily on sporadic matters, and grow rapidly. In 4 or 5 days they assume the pupa form from which the perfect insect emerges. The duration varies with the species and with surrounding conditions, and in cold weather hibernation takes place. During the day the insect remains in shaded places. Its habits are practically nocturnal. It feeds on the juices of plants and, in the case of the female mosquito, on the blood of vertebrates. The male is in most instances purely vegetarian. The female *Anopheles* will take a meal of blood every 2 or 3 days. The number of eggs deposited by them is enormous. The author suggests that there may be other sources from which the mosquito derives malarial parasites than from the human subject, though this matter is not yet settled. There are some facts, however, very suggestive of such other sources, whether they be other mammals or not. Some species of *Anopheles* are a little more inclined to feed during the day than others, and in the vast majority of cases the feeding is nocturnal, a fact which explains some well-known clinical observations in malaria. Speaking of immunity, the author suggests that repeated infection does develop a degree of immunity more or less complete, and he thinks there is ground for believing that by natural selection the natives of highly malarial districts develop a hereditary insusceptibility. The negro children are said to harbor the parasite in abundance, though they are free of fever and cachexia, and it is certain the adult negro is not nearly so liable to pernicious attacks or cachexia as is the European. Any given infection tends to die out after an uncertain period of from 1 to 2 years, and the author believes that the statements made by patients returned from the tropics, that their fevers kept on recurring for 10 or more years, are based on erroneous diagnosis. The matter of prophylaxis involves suppression of mosquitos, prevention of infection of mosquitos, and prevention of infection by mosquitos. Drainage, cultivation, etc., are well-known methods of suppression of mosquitos. The use of petroleum on the surface of pools is a recent addition to these methods. A few ounces on the surface of the water will free a pool for a considerable time of the larvas, but this, perhaps, must be repeated every week or two on account of evaporation. Other measures of this kind have been suggested, but experience has not been favorable. To prevent the infection of mosquitos all malarial patients should be carefully screened. The prevention of infection by mosquitos has been practised in intensely malarial countries, such as the Campagna and in Africa. In an experimental way the protection afforded in parts of Italy to workingmen on the railroads has been very striking. Of 207 railway employees placed under protection in 1899 and 1900, only 10 contracted malaria. Unprotected individuals almost without exception developed malaria at the same time and in the same locality. The author believes that systematic use of quinin, or better, euchinin, 5 to 10 grains once or twice a week, tends to prevent or abort the malaria. The treatment is by no means unvaryingly successful and many cannot stand the heavy dosing.

C. W. Daniels¹ states that *Anopheles funestus* is practically the sole **carrier of malaria** in British Central Africa. He fed 57 specimens of this mosquito on a patient with malaria, and found 27 of the insects afterward to be infected. He also notes that he observed particularly the relation of the age of the subjects to the occurrence of malaria, and found that of 861 children under 15 years of age whom he examined, 216 had enlarged spleens; this sign of malaria was very frequently observed in the earlier years of life. Splenic enlargement is usually absent in adults, and these observations agree with those of Koch in showing a particularly frequent infection in childhood, and Daniels believes that adults gradually acquire a certain degree of immunity to the disease. As to prevention, he insists upon the importance of separating the dwellings of Europeans from those of the natives in order to protect Europeans from mosquitos, a procedure which is almost impossible with natives. He particularly insists that there should be more careful study as to the exact varieties of *Anopheles* which spread the disease, as it is probable that all forms do not act in this way.

The Mosquito as a Transmitter of Malaria.—The relation of the mosquito to the transmission of malaria is now definitely established. The practical demonstrations leave nothing to complete the chain of evidence. Laborers working in intensely malarial countries have been effectually protected against infection by living in carefully screened dwellings and avoiding night exposure, while others living under no special supervision have been uniformly infected; experimenters similarly protected have lived for weeks or months in intensely malarial districts without becoming infected; and healthy persons have been infected by the bite of mosquitos sent from distant places where they had fed upon malarial patients. The last experiment carried out by Dr. Manson in the case of his own son is absolutely conclusive.

A. Celli,² in giving an account of some **experiments in prophylaxis** against malaria, describes the results that have been obtained in Latium. The measures adopted were the use of ointments to prevent the mosquitos biting, mechanical protection of the houses by the use of wire gauze, the inclosure of a porch where persons could sit in the open air without being bitten by mosquitos, and the careful treatment of all persons infected until entire cure was established. As a result, he states that even in very dangerous regions persons who were usually infected passed the entire summer without showing any signs of malaria. These results were obtained even in the miserable homes of the lower classes of peasants, providing the houses were carefully protected.

A. Van der Sheer and J. L. Van Berkelom³ refer to their previous report of the epidemic of **malaria in Zealand**, in a town where this disease had been unknown for 30 years. The cases consisted of tertian fever only. Local epidemics in houses were often seen. They made more careful inspection of the houses during the past year, and repeatedly found specimens of *Anopheles*. They found this mosquito chiefly

¹ Brit. Med. Jour., Jan. 26, 1901.

² Lancet, Dec. 1, 1900.

³ Brit. Med. Jour., Jan. 26, 1901.

in stables where animals were kept, and the mosquitos were sometimes present in large colonies. They were able to infect *Anopheles* by allowing them to bite an infected malarial patient, the patient's blood containing not only the ordinary parasites, but the gametocytes; 18 of 22 mosquitos so used were found to be infected.

D. C. Rees¹ discusses the relation of the mosquito to malaria and the cycles of change in the parasite. The classification of the family *Hæmamoebidæ* to which the amebæ belong may be copied from his article for convenience of reference: "*Family: Hæmamoebidæ, Was-*

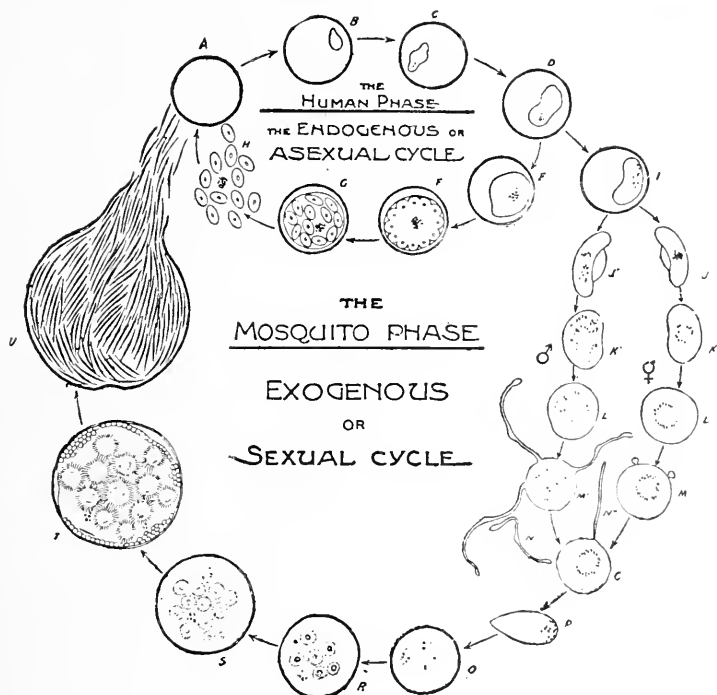


Fig. 1.—Schema showing the human and mosquito cycles of the malaria parasite: A, Normal red cell; B, C, D, E, red cells containing amebulas or myxopods; F, G, H, sporocytes; J, K, L, M, microgametocytes or male gametes; J', K', L', M', O, macrogametocytes or female gametes; N, N', microgametes; P, traveling vermicle; Q, young zygote; R, S, zygotomeres; T, blastophore; U, mature zygote (Modified from Blanchard's diagram illustrating life cycle of *Coccidium schubergi*) (Rees, in Practitioner, Mar., 1901).

ielewski.—*Genus 1: Hæmamoeba*, Grassi and Feletti. The mature gametocytes are similar in form to the mature sporocytes before the spores have been differentiated. Species 1: *Hæmamoeba danilewskii*, Grassi and Feletti. Syn.: *Laverania danilewskii*, Grassi and Feletti, in part; *Halteridium danilewskii*, Labbé, etc. Several varieties—possibly distinct species. Parasites of pigeons, jays, crows. Species 2: *Hæmamoeba relicta*, Grassi and Feletti. Syn.: *Hæmamoeba relicta*, H. subpræcox + H. subimmaculata, Grassi and Feletti; *Proteosoma grassii*,

¹ Practitioner, Mar., 1901.

Labbé, etc. Parasite of sparrows, larks, etc. Species 3: *Hæmamœba malarie*, Grassi and Feletti. Syn.: *Hæmamœba laverani*, Labbé, in part. Parasite of quartan fever in man. Species 4: *Hæmamœba vivax*, Grassi and Feletti. Syn.: *Hæmamœba laverani*, Labbé, in part. Parasite of tertian fever in man. Genus 2: *Hæmomenas* gen. nov. Syn.: *Laverania*, in part + *Hæmamœba*, in part, Grassi and Feletti. The gametocytes have a special form (crescentic). Species: *Hæmamenas præcox*, Grassi and Feletti. Syn.: *Hæmamœba præcox* + *H. immaculata* + *Laverania malarie*, Grassi and Feletti; *Hæmamœba laverani*, Labbé, in part, etc. Several varieties—possibly distinct species. Parasite of the irregular, remittent, pernicious, or estivoautumnal fever in man. This family, it will be seen, contains three species of human parasites, those of tertian, quartan, and estivoautumnal family." The author inclines to the general belief held in England and America that there is not a plurality of species beyond these three, though much remains to be learned regarding the organism or organisms of malignant malaria. The malarial organism reproduces in two ways. There is an asexual cycle occurring in the human blood and first carefully described by Golgi, and to which he gives the name "Cycle of Golgi." A second cycle is that which occurs through the intermediation of the mosquito, and which the author terms the cycle of Ross on account of the contributions of Major Ross. The two cycles are illustrated diagrammatically in the accompanying sketch.

W. N. Berkeley¹ discusses some work which he has undertaken about New York in relation to the **mosquito malaria theory**, and notes that he found two species of *Anopheles*, the *quadrimaculatus* and the *punctipennis*. The *Anopheles* was always found within buildings, chiefly on the walls and ceilings of bedrooms, and was more often found in the dwellings of the poor. The adults were never found out-of-doors. Berkeley believes that the female begins to bite in March. He was able to inoculate *Anopheles quadrimaculatus* with the tertian parasite, but did not succeed in attempts to inoculate men by means of infected mosquitos. The time of development from the egg to the adult *Anopheles* he found to be not more than 19 days, and probably less. The time of incubation between a mosquito-bite and evidences of malaria, he found in one case with a very clear history to be exactly 14 days. He believes that cases of malaria should be reported to Health Boards, and that such reports should be followed by inspection of houses and by instructions to take pains to kill all mosquitos possible, to screen the windows and doors, and to isolate the subject of malaria from mosquitos. It should be insisted also that quinin should be used in treatment, and any standing water nearby should be drained, or covered with petroleum.

M. J. Wright² states that his investigations on mosquitos show that it is not the insect under a state of hibernation but the **larva that survives the cold weather**. The statement is often made that the mosquito itself survives, but the author can find no proof of this, while he has been able to demonstrate a very high degree of resistance on the part

¹ Med. Rec., Jan. 26, 1901.

² Brit. Med. Jour., Apr. 13, 1901.

of the larva. He suggests, therefore, that a search for the larva in winter and the use of kerosene as a destructive agent will accomplish much in the way of extermination.

L. W. Sambon and G. C. Low¹ insist that the common teaching concerning the **posture assumed by Anopheles** is erroneous. When the authors visited the Roman Campagna they made observations of thousands of *Anopheles* in houses and stables in every malarial district, but they did not observe the position which has been described as characteristic. They found the mosquitos in dark places, and when they were on painted surfaces they chose the darker colors as a means of protection. They were never observed to stand with their heads toward the wall and their bodies at right angles to the wall, but retained their feet against a supporting plane and had the posterior part of the body only slightly inclined away from the support. The maximum angle of inclination was about 45 degrees. A point of distinction was the fact that the legs of *Anopheles* stretched out with the tarsi pointing downward, while in the *Culex* they were turned upward in a characteristic way. The authors have observed that some specimens of *Anopheles pseudopicti* brought up from larvae held the body widely inclined from the surface of support, as *Anopheles claviger* is said to do. This, they observe, explains the teaching of Ross and Austin, but it is erroneous to extend to the whole genus a description of an attitude which is characteristic of only a few species of *Anopheles*.

C. Ferni and Tonsi² report the results of their attempts to **exterminate mosquitos** on the Island of Asinara and thus to prevent malaria on this island. Eleven malarial localities were known on the island. The surfaces of lakes and ponds were covered with petroleum, drinking tanks were thoroughly cleansed, the adult mosquitos were killed so far as possible by chlorin gas or other measures, and the mosquitos were entirely excluded from the dormitories of the convicts. As a result, they report that during 9 months of the malarial season no cases occurred in the island. Nine cases were seen in hospitals, but they were all imported.

The Malarial Parasite.—W. B. Laishman³ describes a **modification of Romanowski's method** for staining malarial parasites. He considers that it has a specific effect upon the corpuscles affected by the tertian parasite, and demonstrates the nature of the intracorpuseular forms with great certainty. He insists upon the importance of avoiding handling of the blood films either at the time of their preparation or subsequently, excepting by means of forceps, as any moisture is likely to interfere with the result. He fixes in ether and absolute alcohol, then washes in water, dries in the air, and uses a stain which consists of two stock solutions: first, a 1% solution of methylene-blue in distilled water containing 0.5% of sodium carbonate which has been heated for some time, and to which one may add 0.25% of formalin to prevent the growth of moles. The second solution is 1:1000 eosin in distilled

¹ Brit. Med. Jour., Oct. 20, 1900.

² Lancet, Oct. 20, 1900.

³ Brit. Med. Jour., Mar. 16, 1901.

water. When used, a portion of each solution is diluted with 25 parts of distilled water; an equal volume of each of the diluted solutions is poured on a cover-glass coincidently in such a way that the two stains mix at the moment that they come in contact with the spread. The staining is continued for an hour, the staining fluid then removed, and the preparation examined. The nuclei should be a deep red; if they are not, the staining is continued until there is some degree of overstaining. It is then partly decolorized by placing in absolute alcohol for 2 or 3 seconds and then thoroughly washed in water.

R. Ruge,¹ in **staining for malarial parasites**, recommends the following procedure: A cover-glass should be well heated in the flame in order to free it from fat and other matter; then, after cooling, he touches the upper edge of the cover-glass to the blood drop on the finger, stroking it along so that the drop runs to the lower edge and makes a narrow streak of blood along the lower edge of the cover-glass. This lower edge is then touched to the slide, held at an angle of 45 degrees and drawn rapidly along the slide, the result being a thin smear of blood on the slide, and the avoidance of pressure in smearing. He then fixes it in absolute alcohol for one-half hour. The stain he used is made as follows: 0.2 gram of soda is added to 100 cc. of water, heated to boiling; 0.3 gram of chemically pure methylene-blue is then added, the mixture cooled, filtered, and stood aside. It is ready for use after 48 hours. In staining, it should be poured on the preparation and washed off almost at once. As a result he says that the blood-corpuscles stain a yellowish-green, the parasites a bluish-black, and the larger parasites a grayish-blue. The nuclei of the white cells are more or less deeply stained according to the protraction of the staining period. Basophile granules and red cells are well stained. If the preparations are fresh, the methylene-blue should be stronger; if they are old, however, the methylene-blue should be very dilute.

C. F. Craig² presents some observations upon the quartan malarial parasite and upon the **staining reaction of the quartan, tertian, and estivoautumnal parasites**. After studying 12 cases of quartan malarial infection he decides that the chief peculiarity is that the pigment is motile only in the very young forms. It is dark brown in color, and is present in the form of round granules. After 24 hours the outline of the organism becomes very distinct, and the parasite appears as if stamped into the corpuscle. The amoeboid movements are always slight, and are not observed after 36 hours. The corpuscle invaded by the parasite appears shrunken and is somewhat greenish, but is not often crenated. The quartan resembles the estivoautumnal parasite more closely than the tertian. In staining, Craig recommends Romanowski's, Chenzinsky's, or Fletcher's method. When stained, the plasmodium shows a dark ectoplasm and a pale endoplasm, the latter being really the nucleus and often containing a nucleolus. In the later stages the staining is more homogeneous; the pigment is found at the periphery in all the stages. It does not seem to invade the nucleus.

¹ Deut. med. Woch., July 12, 1900.

² Med. News, Nov. 3, 1900.

Symptoms and Complications.—A fuller knowledge of the occurrence and development of the organism has widened our knowledge of the national history of the disease. The frequency of latent infection or of cases with aberrant symptoms in intensely malarial regions has thrown new light on the question of sanitation in relation to the disease.

J. A. Capps ¹ reports 4 cases of **malaria associated with acute abdominal pain**. As a general summary of the cases he states that with intermittent fever and enlargement of the spleen there were nausea, vomiting, and such acute abdominal pain as to lead to the serious consideration of the advisability of exploratory laparotomy. The acute pain subsided, however, with the other symptoms, after the administration of quinin. Typical tertian parasites in somewhat small numbers were found in the peripheral blood. Leukocytosis was absent in all these cases, and this is of some importance in the diagnosis from such conditions as pelvic cellulitis or salpingitis. The pain was believed to be a neuralgia produced by the malarial toxin in the circulation. [We have seen several cases with considerable abdominal pain, and have knowledge of at least one case in which celiotomy was seriously considered. The subsequent history and the blood-examination cleared up the diagnosis.]

G. L. Peabody ² describes the case of a man of 34 who had a sudden onset of daily attacks of **severe headache**, which lasted every day for several hours, but were accompanied by no fever and no chills. Later his attacks were accompanied by severe abdominal pain in the region of the umbilicus, radiating toward the left kidney. The pain was greatly relieved by vomiting, but vomiting was never spontaneous. When admitted to the hospital, however, he showed fever in the afternoon. Examination of his blood showed the presence of malarial crescents, and quinin and Fowler's solution produced entire cure. The spleen before treatment was large, hard, and tender, and it was noted that it did not move with respiration. Later the spleen did move with respiration, though it gradually returned to its normal size and consistency. The abdominal pain was thought to be possibly due to adhesions of the spleen, and traction upon these adhesions when the spleen enlarged during the malarial paroxysms.

Chas. J. Macalister and Major Ross ³ record a case of estivoautumnal malaria with **punctiform hemorrhages in the retina**. The patient, a sailor, aged 22, who had been treated for some fever at Calcutta 5 years before, but who had never been off duty since, fell ill at one of the ports in the Gulf of Mexico and had repeated chills. When he came under observation in Liverpool, a greatly enlarged spleen and a marked anemia were the principal symptoms. Quinin failed to stop the repeated paroxysms, but Warburg's tincture acted most successfully. He left the hospital, but a week later returned, as it had been discovered on ship that his vision was imperfect. Retinal hemorrhages were then discovered.

¹ Jour. Am. Med. Assoc., Aug. 4, 1900.

² Med. Rec., Jan. 5, 1900.

³ Liverpool Med.-Chir. Jour., Mar., 1901.

M. de Montyeo,¹ in discussing the **relation between malaria and general paralysis**, decides that this affection may bring out the symptoms of general paralysis, or general pseudoparalysis in those who are predisposed to these conditions whether the malaria is acute or chronic. He also thinks it is probable that malaria sometimes produces the condition in those who are not predisposed. He considers that it certainly causes precocious general paralysis in predisposed subjects, and when general paralysis occurs in connection with malaria, it is likely to be of rapid course. He describes 8 cases in which he has observed this relation; 4 of them had also a history of syphilis and a family history of neuroses. One other person had a decided family history of disease of the nervous system, 1 had had convulsions in childhood and nocturnal enuresis, and 1 had suffered from cerebral traumatism. In only 1 case was there a history which was free from similar factors, and in which it might be reasonably thought that the malaria alone had caused the general paralysis.

H. W. Thompstone, H. E. Annett, and R. A. Bennett² describe an **unclassified type of fever which occurs in West Africa**. The disease begins with moderate fever followed by profuse perspiration and a fall of temperature to about normal. After about 24 hours the temperature rises again gradually, up to 105° or thereabouts, but then often goes with great rapidity up to about 107°. The temperature is then persistent for from 14 to 30 days, and is little influenced by drugs or other measures. The liver and spleen do not show enlargement, the urine shows no characteristic changes, and the bowels usually tend to be free. There are no striking nervous symptoms, though patients are often restless and anxious. Malarial parasites have not been found in the affection. It has been noted, however, that the blood has a striking tendency to coagulate almost immediately, and blood films are difficult to prepare for this reason. The only satisfactory treatment is baths. The prognosis is generally grave, about 50% of the patients dying, and the outlook in individual cases is decidedly bad unless some improvement occurs before the end of the third week. Convalescence is slow, and more or less fever may persist for some weeks after the temperature has fallen from the high course followed during the earlier part of the disease. The authors made attempts to discover microorganisms in the blood, but were unsuccessful. There was slight leukocytosis during the course of the affection.

Blackwater Fever.—Ziemann,³ as a result of his extensive experience in blackwater fever, makes the following observations: First, in some regions which are severely affected with malaria one finds people who have a disposition to blackwater fever which varies from time to time. These people have previously had malaria, and the disposition to hemoglobinuric fever usually increases in direct relation to the number of previous attacks of fever. Such people are by no means always members of families in which there is a hemorrhagic diathesis, but in

¹ Rev. de Méd., Nov. 10, 1900.

² Brit. Med. Jour., Jan. 26, 1901.

³ Dent. med. Woch., Oct. 4, 1900.

these families hemoglobinuric fever is more likely to occur. It is also more common after great anxiety, overstrain, etc. Second, the disposition to hemoglobinuric fever is most common in those who have been infected with the small tropical parasites or the estivoautumnal form. It may, however, occur in ordinary tertian or quartan. Third, it is possible that parasites have in some regions an especial virulence which is responsible for the production of hemoglobinuric fever. As to the effect of quinin, he says: Hemoglobinuric fever may appear after a new attack of malaria without the use of quinin; it may appear after a new attack of malaria with coincident use of quinin; it may appear after the use of quinin in persons who had malaria earlier, but have had no recent attack; it may appear in those who have had malaria, but who have neither taken quinin recently nor had malaria recently. The fact that quinin is not necessarily in itself the causation is shown by the repeated observation of blackwater fever in native Africans who have never taken quinin.

Samson,¹ in a general discussion of the intermittent fevers, refers in particular to blackwater fever, which has been variously known as bilious remittent fever, yellow remittent, bilious hematuric fever, hemoglobinuric fever, hematuria, and finally blackwater fever. The leading characteristics are the sudden hemolysis, irregular paroxysmal fever with rigors, bilious vomiting, jaundice, and hemoglobinuria. The symptoms may remain in abeyance for some time and there may be prodromal symptoms for a day or two. As a rule, the onset is abrupt and violent, with a severe chill. After 2 or 3 hours jaundice appears and soon a deeply discolored urine is voided. The paroxysm subsides in 5 or 6 hours and the urine clears and becomes more abundant. With recurring rigors the urine becomes darker and sometimes spontaneous subsidence of the disease takes place. On the other hand, a progress to stupor and death from heart-failure or suppression of urine is not unusual. The mortality is varied, running from 50% or 60% to 25%, and even as low as 13.3%. The latter figures were obtained in cases of the third and fourth recurrence. In considering the various theories, the author states that the notion prevalent in some cases that quinin is responsible for the hemoglobinuria is not unfounded. The relation is simply that of coincidence. He states that there is no specific remedy, and regarding quinin he says that "judging purely from the evidence of facts, we find that quinin has **no specific action in blackwater fever**, and that in most cases it appears injurious. Therefore, quinin should not be used in the treatment of blackwater fever." The preliminary use of calomel and the administration of water in large quantities as a diuretic are useful measures. Food may be administered by the rectum in case of gastric vomiting.

G. Thin² describes a case of blackwater fever, with a report of the **microscopic appearance found after death**. The patient was an engineer of 27, who had died from blackwater fever. The spleen showed, particularly in the Malpighian bodies, a good many pigment granules;

¹ Practitioner, Mar., 1901.

² Brit. Med. Jour., Sept. 1, 1900.

they were present in the white corpuscles also, and to some extent in the tissues of the spleen. They were also found in the liver in the corpuscles contained in blood-vessels, as well as in the endothelium of the capillaries. Pigment was sometimes found between vessels in the liver-cells, and to some extent in the liver-cells themselves. In the kidneys the changes were swelling and granulation of the epithelial cells, disintegration of the cells, and accumulation of their remnants in the tubules and collections in the tubules of granules, which looked to some extent like cocci. The changes in the kidneys were attributed to the action of the toxin produced by the parasites. P. Manson, in discussion, stated that he did not think it justifiable to assume that hemoglobinuric fever is a form of malaria simply because malarial parasites or pigment are found in the blood of the patient.

Rouget¹ concludes, from a careful study of the postmortem findings of a case of **hemoglobinuric biliary fever**, that this disease should be removed from the class of malarial troubles, and is probably due to some specific infection not yet discovered. The case also opposes Koch's view that ieterohematuric fever is due to an intoxication with quinin.

Karamitsao² divides blackwater fever into those cases with and those without icterus. In large doses **quinin may cause hemoglobinuria**, but the writer believes, contrary to Koch's opinion, that the hemoglobinuria may be attributed to malaria.

Hearsey,³ in discussing hemoglobinuric fever in British Central Africa, states that **prognosis is usually good when the secretion of urine continues to be free**, but if there is a sudden reduction in the secretion of urine, and the latter shows much sediment, the prognosis is usually bad. Protracted vomiting and severe bleeding from the nose are also bad signs. He uses quinin in the disease in connection with calomel and jalap.

Quinin and Hemoglobinuria.—Welsford⁴ reports 2 interesting cases of **hemoglobinuria following the use of quinin**. The first case was particularly interesting. The man had a severe degree of malarial cachexia, and had frequently had mild attacks of hemoglobinuric fever during 3 years. He objected to the use of quinin, as he stated that he had found that even one dose gave him hemoglobinuria. He finally, however, consented to take 2 doses of 10 grains each. Four hours after the last dose there was a chill, the temperature went to 105°, he vomited and complained of pain, and an hour later he passed 10 ounces of very dark urine. The urine was clear on the next day, and the temperature remained normal for 7 days. The man was again put to bed, and 3 days later was given 20 grains more of quinin in 2 doses. There was a result similar to that following the first dose. In the other case a man was admitted with blackwater fever and recovered rapidly, quinin not being used. Some weeks later the temperature rose slightly, and 10 grains of quinin was ordered 3 times a day. Two days later

¹ Gaz. Hebdom. de Méd. et de Chir., Oct. 4, 1900.

² Wien. med. Woch., Nov. 3, 1900.

³ Brit. Med. Jour., Jan. 26, 1901.

⁴ Brit. Med. Jour., Dec. 15, 1900.

there was a rapid rise of temperature to 105° , and the appearance of marked hemoglobinuria, the latter persisting for 2 days. This case was possibly merely a relapse that had no relation to the quinin.

Sambon¹ gives a short history of blackwater fever, and of the **quinin theory** in relation to this disease. He concludes that "the connection of quinin to blackwater fever is not one of cause and effect, but merely one of coincidence." "It is reasonable to infer that blackwater fever may be due to a protozoal organism akin to that of cattle in redwater fever." The physicians who have practised in districts where blackwater fever is frequent almost without exception hold the opinion that the malady is specific.

A. J. Chalmers,² in discussing **estivoautumnal fever** in Europeans on the Gold Coast of Africa, states that this is the most common form of malarial fever in this region. The chief predisposing causes are exposure to the sun, chilling, worry, excesses, improper food, constipation, and organic disease. He believes that the infection is carried largely by a newly described species of mosquito which he calls *Anopheles kumassii*. The parasite found is usually nonpigmented. The quotidian type of fever was frequently observed.

Craig,³ in discussing the **malarial fevers observed in the Philippine Islands**, states that out of 2000 cases only 12 were of the quartan type.

Treatment.—R. Koch,⁴ in reporting upon his work upon malaria in Stephansort, states that the disease has apparently almost disappeared from that region, since in May and June, 1900, although the conditions of the weather were very favorable to the development of the disease, but 4 cases were admitted to the hospital. All these were relapses from previous attacks of quartan fever, the most obstinate of all the forms. Koch believes that this indicates that his method of using **quinin for prophylactic purposes**—that is, to prevent old cases of malaria from transmitting the disease to others—has proved successful, and he intends to carry out the experiment in other places. He thinks it will be impossible to devise successful measures of killing off mosquitos from any wide area.

A. Duncan,⁵ in opening a discussion on the **treatment of malaria by quinin**, stated that he considered it established that quinin has a prophylactic action against the occurrence of malaria. He has seen no results from the use of arsenic as a prophylactic, and narcotin is not so valuable for this purpose as quinin. His experience, in comparing quinin with other drugs in the treatment of malaria, has been wholly in favor of quinin. He gives the drug first by the mouth, and if this proves insufficient, he gives 20-grain doses by the rectum. W. J. Buchanan, in continuing the discussion, stated that he had given quinin or cinchonidin to the prisoners in the Punjab in 1894, and had so far reduced the rate of morbidity and mortality in that region that this

¹ Med. Rec., Apr. 27, 1901, from Practitioner, Mar., 1901.

² Lancet, Nov. 3, 1900.

³ Med. News, Nov. 3, 1900.

⁴ Dent. med. Woch., Aug. 23, 1900.

⁵ Brit. Med. Jour., Sept. 1, 1900.

method of prophylaxis was used subsequently in other provinces and has been so used for 5 years past; his extensive experience leads him to decide that the prophylactic use of quinin will to a considerable extent reduce the mortality from malaria, and that prolonged use of quinin does not cause any ill effects. He has never seen a case of hemoglobinuria which he could attribute to the use of the drug. R. Fielding-Ould believes that the drug cannot be used as a prophylactic against malaria, since quinin acts upon the parasites only when they are at a certain stage of development. He considers the idea that quinin is a prophylactic to be erroneous, and thinks that quinin is likely to damage digestion and thus do harm if malaria occurs, particularly through liver-disturbance consequent upon the disorder of digestion which the drug produces. Patients with disturbance of the liver are particularly likely to be gravely influenced by the severe forms of the disease. If the digestion is disturbed in malaria, he always gives quinin by hypodermic injections, using 3 grains of the hydrochlorate as a dose. Rectal administration may sometimes be advantageously substituted for the hypodermic, using 30 or 40 grains at a dose. He continues the administration of quinin for some weeks after all active symptoms have disappeared. P. Manson stated that while quinin does not immunize against malaria or against the entrance of the parasite, it does prevent the development of the parasite, and therefore may be used as a prophylactic, being most active for this purpose in the genuine tertian forms of the disease. D. C. Rees thought that the prophylactic administration of quinin, while it did not reduce the number of cases, did lessen the severity of the cases and reduce the mortality. C. B. Maitland has had good results from the use of methylene-blue in doses of 3 grains 3 times a day; he had also found that quinin could be given with safety in pregnancy. E. Henderson, on the contrary, considered quinin a dangerous drug in pregnancy, and thought that if it were given it should be guarded by opium. Fielding-Ould recommended, in the treatment of an attack, a dose of 15 grains when the organisms are about to sporulate, or when they are in their youngest stage as sporocytes. Harford-Battersby thought that the best results are obtained by administering 10 grains of quinin at the beginning of the sweating stage, after freely opening the bowels. Henderson gives 15 grains after the temperature has fallen in the sweating stage.

Patrick Manson,¹ in discussing the treatment of malaria, states that **quinin is the only reliable drug**. Euchimin, a derivative of quinin, seems to be useful, though it is still on trial. Its great advantage is the tastelessness, but its expense is a drawback. He warns against the administration of pills or capsules, advocating liquid administration by mouth or rectum, and hypodermic injection. For the latter purpose the bihydrochlorate, a very soluble salt, is useful. The injection should be made deep into the muscular tissue. The significant statement is made that "it may be safely asserted that any intermittent fever which resists quinin for 3 or 4 days is not malarial." Arsenic is useful as a blood restorer after malaria, but has no power over the parasite, at all events

¹ Practitioner, Mar., 1901.

when given in safe doses. Methylene-blue in 3- or 4-grain doses seems to be of service, but many other drugs recommended are worthless.

INFLUENZA.

Etiology.—The relation of the bacillus to influenza is generally accepted, but thus far it must be confessed that little practical use has been derived from this knowledge either in diagnosis or treatment.

A. Wassermann,¹ in discussing the **pathology of influenza**, reports that in a series of bacteriologic examinations of the cases of influenza, which he investigated during the past year, he found that it was difficult to demonstrate the bacilli in the sputum in many instances, and it was hard to say that they were actual cases of influenza. This was true in a number of regions. The bacilli when present disappeared quickly from the sputum. At the same time there were evidences of marked intoxication. Experimental work in bacteriology has demonstrated that rapid disappearance of infectious agents together with coincident intoxication bears a direct relation to the production of bactericidal immunity. The patients in whom this rapid disappearance was observed had practically all had influenza years before. Wassermann's conclusion was that the immunity which they had acquired had been so reduced as not to prevent new infection, but was sufficient to destroy the bacilli rapidly, and hence in many cases there was marked outbreak of toxic symptoms. This leads him to the conclusion that the immunity acquired in previous years is disappearing, and that probably the time is soon coming when there will be once more a general susceptibility to influenza and a new pandemic of the disease.

Symptoms.—The diagnosis of influenza being difficult and often quite uncertain, the symptomatology is similarly indefinite. Doubtless many cases regarded as influenza are infections of different character. Under these circumstances it is very apparent that the symptomatology of the disease cannot be drawn with great certainty, and unusual types must be looked upon with reservation or suspicion.

J. S. Bury,² in opening a discussion on the **influence of influenza upon the nervous system**, stated that the effects might be divided into two general groups—those which develop during or directly after the febrile stage, which are exemplified by meningitis and encephalitis, and those disorders which appear after the influenza has vanished, neurasthenia and neuritis being instances of such. During the attack two general classes of symptoms are seen—the comatose and the delirious. The comatose type is likely to be fatal, and postmortem examinations show nothing, or there may be congestion of the meninges or actual meningitis. Spinal cord symptoms are not common during the attack, but are not rare as sequels. They may, however, be seen in the attack. The variety of nervous symptoms seen after influenza is almost unlimited, and is greater than those after any other disease. The symptoms are produced either by toxins without the occurrence of morphologic change,

¹ Deut. med. Woch., July 12, 1900.

² Brit. Med. Jour., Sept. 29, 1900.

or by slight morphologic changes in the nerve tissues. W. H. Broadbent, in discussion, stated that it is highly probable that some of the effects are due to a toxin and others to the direct action of the microorganisms, the comatose being probably the result of direct microorganismal infection of the nervous tissues. He insisted, however, that in many cases showing marked nervous symptoms the essential difficulty was a primary instability of the nervous system rather than specific influence of the influenza poison. C. Allbutt considered the striking suddenness of the onset of nervous symptoms to be characteristic of post-influenzal nervous disorders. G. N. Pitt believes that cardiac disturbances seen in influenza may often be attributed to disturbance of the ganglia and nerves rather than to muscle-lesions. S. K. Mullick made the wholly rational suggestion that many of the symptoms attributed to attacks of influenza were due rather to previous alcoholism or syphilitic or rheumatic infection, the symptoms being excited by the influenzal poisoning rather than caused by it. R. Saundby insisted upon the fact that influenza is a general infectious process and not a local disease of the lungs or nervous system. He stated that he considered postinfluenzal diabetes to be due to involvement of the pancreas, and he believes that interstitial pancreatitis when present in diabetes may frequently be the result of previous action of toxins of infectious diseases. W. Ewart considered it probable that there is a chronic influenzal intoxication caused by persistence of the microorganisms in the upper portion of the respiratory tract, and he recommended care of the nasal cavities and their disinfection. S. Thomson further stated that complete anosmia is not uncommon in persons who have previously had influenza; and when the history points toward an influenzal origin and local lesions are absent, he thought it might be concluded that influenza had caused the anosmia. W. Calwell considered it very important to determine whether a person had recently had influenza or not before administering anesthetics, especially chloroform. He believes that a considerable number of deaths under chloroform have been due to the depressing influence of recent attacks of influenza. T. Buzzard believes that the number of severe nervous diseases produced by toxemia has recently largely increased, and considers that a good deal of this increase may be attributed to influenza.

Mosher,¹ in discussing the **relations of influenza to the nervous system**, states that the influenza of infancy is accompanied by production of a toxin having a severe effect upon the nervous system. This effect may be immediate and confined to the peripheral nerves and cerebrospinal centers. The remote effect is a lower tone of the nervous system generally, as a result of which various disturbances of organic action may occur. Postinfluenzal insanities due to the nervous depression are not infrequent. The prognosis in all of these conditions is comparatively good.

F. Franke² discusses his observations on the **character of the pharynx, tongue, and spleen in influenza**. He describes a form of

¹ Med. News, Dec. 15, 1900.

² Deut. Arch. f. klin. Med., Bd. LXX, No. 3 u. 4.

redness of the anterior pillar of the fauces which has been invariable in his experience in this disease and has been absent in other conditions. This has occurred not only in the cases with bronchial and catarrhal symptoms, but also in cases of nervous and intestinal grip. He has not found the condition in other diseases after a very thorough investigation. The streak of redness is from 2 or 3 millimeters up to 6 or 7 millimeters in width. The uvula is free, and the tonsils, excepting in very acute cases, are also uninvolved. No symptoms are present in many of the cases. Sometimes, however, there may be subjective sensations, and these at times become severe, taking the form of pain in swallowing, contractions in the throat, and the like. A second sign to which he calls attention is an enlargement of the papillas at the end of the tongue. While not so frequent as the other, this is fairly common and assumes a prominence equaled only in scarlet fever and some cases of measles. The peculiarity of the tongue may occur as early as the second or third day, or may appear later. Referring to the condition of the spleen, he states that he has found this organ considerably enlarged in a proportion of the cases of protracted or relapsing influenza. It is not very uncommon in acute cases. [We have repeatedly observed the peculiar type of tongue which the author describes, but its absence in a very notable proportion of cases makes the sign of little practical value. Our attention was called to the buccal and pharyngeal conditions by several publications of a number of years ago, and we have faithfully investigated the matter in our own cases, with the result that we have failed to find any reliable diagnostic features.]

Doering¹ directs attention to the fact that the recent epidemic of influenza in Germany showed marked clinical differences from most previous epidemics, particularly in the fact that **severe intestinal symptoms** were usually the most marked characteristics of the cases. In a fatal case there was septicemia, and influenza bacilli were found in the lungs and in the pus from an otitis media, but the other organs and the cerebrospinal fluid contained a bacillus belonging to the proteus group. The source of the proteus infection he considered to be the intestine, and he stated that one could follow the advance of the bacteria through the intestinal wall and along the mesenteric lymph-channels. He believed that the proteus infection was really a secondary infection occurring after the onset of the influenza.

W. C. Phillips² reports that he has frequently observed a simple or suppurative enlargement of the lymph-glands as a **sequel of tonsillar involvement** in influenza. In one case he made a bacteriologic examination of the pus after suppuration had occurred, and streptococci were found.

O. P. Gerber³ contributes some **observations concerning the blood in the recent influenza epidemic**. An increase of the white corpuscles occurred with the disappearance of fever, more rarely during the fever. This at first involved the polymorphonuclear neutrophiles, while the oxy-

¹ Münch. med. Woch., 1900, No. 4.

² N. Y. Med. Jour., Aug. 4, 1900.

³ Wien. med. Woch., 1900, No. 25 u. 27.

philes decreased or entirely disappeared, and the small lymphocytes were also decreased. With the disappearance of the acute stage, however, the small lymphocytes increased, as did the eosinophiles, and finally the transitional and large mononuclears, while the polymorphonuclear neutrophils were found decreased. The red blood-corpuscles were usually decreased, as was the hemoglobin. The leukocytosis never reached a high degree, varying between 11,000 and 14,000; counts as high as 20,000 were strong indications of some complication, particularly in the lungs. [Our own experience has indicated a lower number of leukocytes as the usual condition. We have occasionally found moderate leukocytosis (12,000 to 15,000) in seemingly uncomplicated cases, but marked leukocytosis has always indicated some complication.]

Complications.—J. Carslaw¹ reports 4 cases of **influenza complicated by acute meningitis**. Three cases were fatal, but postmortem examination could be undertaken only in 1, and was necessarily incomplete in that one. There was a general purulent meningitis, and the exudate contained, so far as could be determined from smear preparations, only large diplococci. Cultures were negative. The influenza bacillus may have been present in addition to the diplococcus, or it may have been a pure secondary infection, in this case probably from the respiratory tract. The case was interesting because of the presence of an alveolar sarcoma of the pituitary body, while acromegaly had been absent during life, and attacks of pain in the head, which had occurred for about 6 months before his death, had been the only symptom that could be considered to be in any way related to the tumor. The only patient who recovered was a boy of 9, who had characteristic symptoms of cerebral meningitis with some spinal symptoms, but who recovered. The cases were definitely believed to be instances of influenza because of their occurrence in a region and at a time when this disease was epidemic, and because the patients had presented symptoms of influenza at the beginning of the attack. Notable points in the cases were that in 3 there were no definitely localizing symptoms, the chief symptoms being a restless delirium, with severe headache, and afterward the occurrence of unconsciousness and coma. Carslaw notes that the meningitis in these cases may have been a direct result of an infection, or in any or all of the cases may have been due to a secondary infection which was simply predisposed to by the occurrence of influenza. He also describes a case in which severe multiple neuritis occurred after influenza. He believed that he could exclude the influence of alcohol, and that the complication was due to influenza.

G. Möller,² in reporting upon the influenza epidemic which occurred in the Maternity Clinic at Griefswald, stated that from his observation of 21 cases he decided that the **earlier months of pregnancy are badly influenced**. In one case abortion occurred in the fifth month. In the 20 other cases there were 5 instances of onset of labor before the beginning of the ninth month. These were the most severe cases, however, and mild attacks of influenza had little influence. The labor was

¹ Brit. Med. Jour., Jan. 12, 1901.

² Deut. med. Woch., July 19, 1900.

usually characterized by energetic onset of severe pains, but the uterus soon became exhausted and had to be stimulated. There was constant danger to mother and child. Puerperal hemorrhage was common. The children showed no distinct disturbance of their health.

Treatment.—R. W. Wilcox,¹ in discussing the treatment of influenza in adults, advises against the use of opium and of depressants of the circulation. The disease in adults not induced by previous disease or bad habits is comparatively harmless.

YELLOW FEVER.

Etiology.—The transmission of yellow fever by mosquitos has been the subject of interesting study on the part of Drs. Reed, Carroll, Agramonte, Lazear, and others at Havana. As long ago as 1881, Finlay, of Havana, suggested that the infection might be propagated by the mosquito. Drs. Reed, Carroll, Agramonte, and Lazear were able to demonstrate to their satisfaction the transmission of the disease by *Culex fascialis*. The mosquitos were allowed to feed on patients and then on nonimmune persons. In several instances positive results occurred. Unfortunately, Dr. Lazear lost his life as the result of the experiment. On August 16th he had been bitten by one of the contaminated mosquitos which fed on an infected patient 10 days previously. There was no result from this bite. On September 13th he was bitten by a mosquito supposed to have been *Culex* and allowed the insect to satisfy itself. Five days later he felt unwell and the next day was quite ill with a marked attack. While the results of these earlier experiments, and particularly that which so unfortunately led to a fatal termination in the case of Dr. Lazear, were uncertain, subsequent investigations of the authors have been more definite and seem to be fairly conclusive. The heroic work of the investigators and the persons who voluntarily offered themselves for experiment deserves the grateful recognition of mankind. The name of Dr. Myers, of the British Commission, who died of yellow fever while prosecuting his researches, must be added to this roll of honor.

W. Reed, J. Carroll, A. Agramonte, and J. W. Lazear² contribute their report upon the work which they performed as a Board of Medical Officers convened for the purpose of studying the acute infectious diseases in the Island of Cuba. This report consists chiefly of their study of the **etiology of yellow fever**. A general summary of their results is this: The blood taken during life from the general venous circulation on various days of the disease in 18 cases of yellow fever successively studied gave negative results as regards the presence of *Bacillus icteroides*. Cultures taken from the blood and organs of 11 yellow fever cadavers were also negative as regards the presence of the same bacillus. They consider that *Bacillus icteroides* of Sanarelli bears no causative relation to yellow fever, but when present should be considered to be a secondary invader in this disease. As a

¹ Med. News, Dec. 15, 1900.

² Phila. Med. Jour., Oct. 27, 1900.

result of the second part of their study they state that the mosquito serves as the intermediate host for the parasite of yellow fever, and it is highly probable that the disease is propagated only through the mosquito. They are inclined to attribute the difference between their results and those of others in attempts to cultivate *Bacillus icteroides* to the tendency of other investigators to rely upon the appearance of colonies on gelatin plates without further study. The work upon the mosquito was suggested by the investigations of C. J. Finlay, and the relation which has been demonstrated between the mosquito and malaria. Their investigations were carried out with mosquitos furnished by Finlay, which were identified as *Culex fasciatus*. [It cannot be said that their results demonstrate that the mosquito did transmit infection in cases in which it is considered probable by the authors that such transmission occurred, and certainly the number of cases is too small to allow of a very positive conclusion being drawn from their observations.] The experiments were made on 11 non-immune individuals, with 9 negative and 2 positive results. They state, however, that 5 of the 9 persons who failed to show any result were inoculated by mosquitos that had bitten very mild cases of yellow fever on the fifth day of the disease. One person was inoculated by a mosquito that had bitten a patient suffering with a mild case on the seventh day of the disease, and they believe that the negative results may be attributed to this fact. In the 3 remaining negative cases the mosquitos had bitten patients with severe cases, the interval before biting other persons varying from 2 to 6 days. The 2 cases which they considered positive occurred in Dr. Carroll and in a white American resident in the military reservation of the Columbia barracks. The same mosquito bit both these persons, but the second person was also bitten by two other mosquitos. It is admitted, however, that Dr. Carroll had been in an autopsy room in which autopsies upon yellow fever had been made, and the room was in an uncleanly condition, and Dr. Carroll's attack appeared 5 days after he was in this room, which is about the period of incubation of yellow fever. In the second case there was no such evident possibility of infection by other means, and the probability of infection by the mosquito seems much more reasonable. The third case occurred in Dr. Lazear, of the Board, and proved fatal. He had been bitten 5 days before he was taken ill by a mosquito, the previous history of which was apparently not known; he was at that time making investigations on the blood of yellow fever patients.

Reed, Carroll, and Agramonte¹ were able to **infect with yellow fever** 85.71% of those individuals who had been bitten by previously contaminated mosquitos (*Culex fasciatus*). They conclude as follows: "(1) The mosquito (*Culex fasciatus*) serves as an intermediate host for the parasite of yellow fever. (2) Yellow fever is transmitted to the nonimmune individual by a mosquito that has previously fed on the blood of those sick with this disease. (3) An interval of about 12

¹ Med. Rec., Feb. 16, 1901.

days or more after contamination appears to be necessary before the mosquito is capable of conveying the infection. (4) The bite of the mosquito at any earlier period after contamination does not appear to confer any immunity against subsequent attacks. (5) Yellow fever can also be experimentally produced by subcutaneous injection of blood taken from the general circulation during the first and second days of this disease. (6) An attack of yellow fever produced by the bite of the mosquito confers immunity against a subsequent injection of the blood of an individual suffering from the nonexperimental form of this disease. (7) The period of incubation in 13 cases of yellow fever has averaged from 41 hours to 5 days and 17 hours. (8) Yellow fever is not conveyed by fomites, and hence disinfection of articles of clothing, bedding, and merchandise supposedly contaminated by contact with those sick of this disease is unnecessary. (9) A house may be said to be infected with yellow fever only when there are present within its walls contaminated mosquitos capable of conveying the parasite of this disease. (10) The spread of yellow fever can be most effectually controlled by measures directed to the destruction of mosquitos, and the protection of the sick against the bite of these insects. (11) While the mode of propagation of yellow fever has now been definitely determined, the specific cause of this disease remains to be discovered." [Some of these conclusions do not seem to us established by the work of the authors. Even admitting the role of the mosquito as demonstrated, it remains uncertain whether this is the sole means of transmission. More conclusive evidence than that furnished by these experiments is needed.]

Reed, Carroll, and Agramonte¹ presented before the Association of American Physicians a further report of their work on **experimental yellow fever**. The present report includes cases of yellow fever produced in nonimmune persons by direct injection of blood of yellow fever patients, and by the bite of mosquitos that had previously fed on patients. Of the former group, 4 cases are reported. These were all positive and demonstrate that, as in malaria, an intermediate host is unnecessary for the development of the germ. In each of these cases cultures from the blood of the individual from whom the blood was taken for injection showed no Sanarelli bacilli and no other microorganisms except in one case—*Staphylococcus citreus*. There were 8 cases of infection following the bite of *Culex fasciatus*. In their previous reports they have recorded these cases produced by the bite of the same species of mosquitos. The period intervening between the contamination of the insect and the production of the disease was in this series from 39 to 57 days; one of the mosquitos lived to the sixty-ninth day and another to the seventy-first day. These facts explain how a building that has been vacated for several months might still retain the possibility of infection. The mosquitos used in the present group of cases were contaminated at a later stage of the disease than those in the former group of cases—that is, on the third day and during the secondary rise of fever. The mosquitos applied on the fourth day did not become contaminated. Regarding the incuba-

¹ Am. Med., July 6, 1901.

tion, their experiments in 16 cases have shown an average of 3 days and $15\frac{1}{2}$ hours. The 12 mosquito infections separately gave a period of 3 days and 22 hours, while the injections were followed in 2 days $19\frac{1}{2}$ hours by definite symptoms. Their experiments show in some cases an incubation period longer than the 5 days which is the period generally allowed for quarantine. Regarding the character of the attack, they found that in 33% of the cases infected by mosquitos, the attack was mild, while 25% of those injected were mild. The diagnosis of the cases of mosquito infections would have been extremely difficult in some instances had not the entire history of the cases been known.

Finlay¹ recalls the fact that in 1891 he **suggested the mosquito-theory** of the transmission of yellow fever. He fully explains by this theory, which has been so abundantly proved by the recent investigations of the army yellow fever board, the propagation of the yellow fever epidemic from Havana to Saint Nazaire (France) through the "Anne-Marie," in 1861, so admirably studied and described by Melier in his report to the French Academy.

Finlay² gives a complete and interesting history of the **progress made** in the nineteenth century in the study of the propagation of yellow fever, and the details of his original experiments with *Culex fasciatus*, carried out in Havana in 1881.

Charles Finlay³ refers to the work of Drs. Reed, Carroll, and Agramonte, and recalls his own contributions in the same direction. The point of special value in these recent investigations is the demonstration that it is **possible to contaminate a mosquito through a single bite** of a person suffering with yellow fever, so that after a lapse of a certain interval, a bite from the same mosquito will develop an attack in non-immunes, and the contaminated mosquito will retain this power during the remainder of its life. This he regards as the most important and original discovery made by Reed, Carroll, and Agramonte. He refers to an experience of his own. A mosquito was applied, August 13, 1883, to a hemogastric case of yellow fever in which the attack had begun on August 8th. Two days later, on the 15th, the same insect was applied to a second case of hemogastric yellow fever which had begun on the 10th. Finally, on the 17th, the insect was applied to a nonimmune. On the 26th this person, who had been perfectly protected from other sources of infection, was taken ill with a mild attack of yellow fever, and subsequently resided for 10 years in Havana without having yellow fever. He quotes this case as instancing a minor error in the report of Drs. Reed, Carroll, and Agramonte, who state that the mosquito cannot be contaminated after the third day of the disease.

H. E. Durham⁴ publishes an abstract of an interim report of yellow fever in the name of himself and the late Walter Myers. The authors who constituted the Yellow Fever Commission of the Liverpool School of Tropical Medicine were both taken ill with yellow fever and unfortunately Dr. Myers succumbed. They report having found in each of

¹ Med. Rec., Jan. 19, 1901.

² Jour. Am. Med. Assoc., Apr. 13, 1901.

³ Med. Rec., Feb. 9, 1901.

⁴ Lancet, Feb. 23, 1901.

14 cadavers a **bacillus resembling the influenza bacillus** and having a length of about $4\ \mu$. It occurred in various organs as well as in the intestinal tract, being in extraordinary preponderance over all other microorganisms in the latter situation. At times the preparations of mucus from the intestine gave the appearance of pure cultures. The organs usually showed no other bacteria. This bacillus has been met with, though not recognized, by three other observers—Sternberg, Freire, and Carmona y Valle. It is best stained with carbolic fuchsin, and the action of the stain must be prolonged,—that is, several years,—followed by differentiation in weak acetic acid. Two hours may not suffice, though the bacilli appear from 12 to 18 hours. Pure cultures were not obtained in ordinary aerobic or anaerobic tubes, but some pure cultures were prepared by placing a whole mesenteric gland cut out with a thermocautery into broth under the hydrogen atmosphere. The authors could find no evidence of protozoa in this disease. Referring to the work of the American Commission, and especially the man-to-man transference by means of certain gnats, they state this is hardly intelligible in the case of a bacillary disease, and moreover does not seem to be borne out by the experiments of that commission. Finally, they believe that the evidence in favor of their bacillus is stronger than has been adduced in the case of any other organism.

J. O. Cobb¹ discusses the article of Reed and his assistants on the etiology of yellow fever and **takes exception to the view that the mosquito is the most active method of transmission** of yellow fever. He mentions 2 cases in which mosquitos were noted about regions where cases of yellow fever occurred, but with the exception of these instances he states that in the settlements of Orwood and Taylors there were no mosquitos at the time that yellow fever occurred in these places. He also describes instances in which persons who had been exposed to yellow fever went to their homes and were taken sick with yellow fever, other cases appearing about 14 days later without any evidences that mosquitos were about or had contributed to the transmission of the disease. He states that he is more ready to believe that other animal parasites may be the host of the germ than the mosquito. He also notes the fact that yellow fever does not seem to spread freely in certain zones in which mosquitos are often present in large numbers, and he particularly directs attention to the old story of the vessel "Plymouth." In spite of the fact that this vessel was twice caught in the ice and remained there until thawed out, and although she was thoroughly fumigated a number of times, there developed a well-marked case of yellow fever in March, 6 days after she had sailed from Boston, when she had been out of sight of land all the time. It is possible, but highly improbable, that mosquitos could have lived on this vessel throughout this period. One strong objection to the mosquito theory is the fact that it is nearly always 14 days between the occurrence of a first case and the development of other cases. Also, it is curious, if the mosquito theory is true, that the removal of exposed persons from in-

¹ Phila. Med. Jour., Nov. 24, 1900.

fected houses to tents will cut short the spread of the disease. Cobb admits that it is quite possible that the mosquito may at times aid in the spread of the disease, but he does not think that it is probable that this insect is peculiar in this way or is especially active.

Carter,¹ after detailing a large number of cases of yellow fever, mostly from personal observation, finds that the **shortest incubation** recorded in his series is 3 days, the longest $8\frac{1}{2}$ days, while very few of the cases show over 6 days.

TUBERCULOSIS.

Etiology.—Pettersson,² in some experimental studies concerning infection with tubercle bacilli, determined that **after being dried for 60 days tubercle bacilli would not cause infection in guinea-pigs.** The bacilli took stains, however, even after a longer time had elapsed. It was difficult to infect guinea-pigs through inhalation of dried sputum, but **in every one of a hundred experiments he caused infection when the sputum was diluted with water and then inhaled by the animals in the form of a fine spray.** He held cover-glasses before the mouths of 25 tuberculous persons, and in 23 instances found after coughing attacks that there were from 25 to 100 bacilli upon the cover-glasses. If the same method were adopted, the cover-glasses then washed off with water, and this water inhaled by guinea-pigs in the form of a spray, infection followed in nearly every instance. He insists that **flies constitute a source of danger in the transmission of tuberculosis.** He found that flies practically always contained tubercle bacilli in their intestines after they had lighted upon tuberculous sputum, and by dissolving the excrement of 15 flies in water and spraying guinea-pigs with this mixture he was able to produce tuberculosis. He found that direct sunlight kills tubercle bacilli in from 15 to 20 hours. Ordinary daylight takes, on the contrary, from 5 to 7 days. He saw no influence from a temperature as low as -80° C. A temperature of $+101^{\circ}$ C. killed the bacilli in a half hour. A 2% to 4% formalin solution made sputum harmless for guinea-pigs when it had acted for as long as 24 hours; but he does not consider formalin inhalations of value in the treatment of tuberculosis, as he saw no satisfactory results from them, and when used in an active strength they did actual damage. He could determine no effect on the bacilli as the result of the use of the x-rays. [This is an interesting contribution to previous testimony, which was already convincing, that the danger of infection from a tuberculous patient does not reside in the dried sputum alone. The suggestion concerning the danger of infection by flies is useful and directs attention to the broader general fact that there are many ways in which a subject of tuberculosis becomes a menace to the health of those about him as to the general public unless careful disinfection of his sputum and other similar measures which are perfectly feasible in most cases are carried out and those who come in con-

¹ Med. Rec., Mar. 9, 1901.

² Norsk. med. Arkiv., Nos. 30 and 33.

tact are made to understand that there is danger in careless association with such persons.]

R. Beek,¹ by means of an arrangement through which air was kept passing over **cuspidores which contained sand or sawdust into which tuberculous sputum had been expectorated**, investigated the importance of such receptacles in the dissemination of tuberculosis. He found that the sputum became sufficiently dry after about 24 hours to allow of the tubercle bacilli being scattered about in the air by any draught blowing over the cuspidore. This did not occur after 12 hours, however. Investigation seemed to show that **with ordinary care such arrangements are not dangerous to health, but they may readily become so unless reasonable care is used.**

Bovine and Human Tuberculosis.—The most important communication of the year regarding tuberculosis, or indeed any medical subject, was that of Prof. Robert Koch² at the English Congress on Tuberculosis. After stating that even in his earlier writings he had maintained a conservative attitude toward the question of identity of human and animal tuberculosis, Koch proceeds to detail his recent experiments, upon which he bases the claim that **human tuberculosis and bovine tuberculosis are distinct diseases.** The experiments referred to were made in conjunction with Prof. Schütz, of the Veterinary College of Berlin. Young cattle free of tuberculosis were made to inhale pure cultures of tubercle bacilli or dried sputum from tuberculous patients (human); others were inoculated subcutaneously, intravenously, or intraperitoneally with bacilli or sputum. Six cattle were fed with tuberculous sputum almost daily for 7 or 8 months; 4 inhaled great quantities of bacilli, distributed in water and scattered as a spray. **None of the 19 cattle showed any symptoms** of disease, and they gained considerably in weight. They were killed in from 6 to 8 months, and no tuberculous lesions were detected. Only at the place of injection abscesses containing tubercle bacilli were found. The results of injection were exactly the same as those from injection of dead tubercle bacilli. When, however, the same series of experiments was carried on with bovine tubercle bacilli, the severest tuberculous disorders of the internal organs began in about a week in all of the infected animals. The result was the same whether the bacilli were introduced under the skin, in the peritoneum, or into the vascular channels. Intense local tuberculous lesions were found when the animals, which had grown very weak and thin, were killed, after a lapse of 3 months; and there were advanced lesions of the internal organs, notably the lungs and spleen. Feeding experiments made with swine gave similar results. The animals fed with human bacilli or sputum for 6 months showed at most slight nodules in the lymph-glands of the neck, and in one case a few gray nodules in the lungs. On the other hand, the swine fed with bovine bacilli showed extensive tuberculous lesions of the lymph-glands of the neck and mesentery and of the spleen and

¹ Wien. klin. Woch., 1900, No. 27.

² Jour. Compar. Path. and Therap., Sept., 1901.

lungs. He concludes that **human tuberculosis differs from bovine tuberculosis and cannot be transmitted to cattle.** Referring next to the question of transmissibility of bovine tuberculosis to man, he states that, although the occurrence of tubercle bacilli in milk and butter is known to be frequent, infection of man from this source does not occur or is at least very exceptional. He holds that a local tuberculous lesion of the intestines must be found to warrant the supposition of alimentary infection. He can remember only 2 cases of primary tuberculosis of the bowel in his entire experience, and he refers to statistics at several hospitals in Berlin to prove the great rarity of primary intestinal tuberculosis. In these rare cases he holds that it is quite likely that tubercle bacilli (of human origin) may somehow have reached the intestinal canal of the diseased person. Cultures of lesions in such cases (which he has been able to make in only a few cases on account of the rarity of these cases) have not spoken in favor of bovine tubercle infection. Finally, he concludes that the question cannot be positively answered whether man is susceptible to bovine tuberculosis; one may assert that such infection is very rare if it ever occurs. He estimates this occurrence as very little greater than that of hereditary transmission; and he **does not believe it advisable to take measures against transmission through milk or meat.** Other matters contained in the address of Prof. Koch are of less interest and need not be referred to now. The notable portion is that which has been given in abstract. It is all the more remarkable because it had been universally believed by medical men that the evidence in favor of the close relationship or identity of human and bovine tuberculosis was contained in the contributions of Koch himself. It cannot have failed to strike the reader of the abstract, as it did many of those who heard the address, that the testimony there offered is inadequate to establish the views now put forward by Koch.

In the discussion, Lord Lister stated that the matter of relationship of human to bovine tuberculosis is of the greatest possible importance; that it would insure a great simplification of sanitary measures if the distinctiveness of the two diseases could be shown; but that on the other hand it would be a grievous thing if the present regulations regarding milk-supply were relaxed, and it then should be found that the conclusion was erroneous. He could not believe that the evidence brought forward by Koch was conclusive, though he felt that it suggested further inquiry. The fact that human tuberculosis is not readily transmitted to animals by no means proves that bovine tuberculosis cannot be communicated to man. He instanced variola. Attempts to inoculate human smallpox into the calf have been so very rarely successful that eminent pathologists had concluded that smallpox and cowpox were entirely different diseases. It is now known that the two diseases are the same excepting for the modifications suffered by smallpox in passing through the cow. He suggested that some species of animals might serve as the intermediary host for the tubercle bacilli between man and the bovine species; or again, if sufficient experiments were conducted,

human tuberculosis might occasionally be found transmissible to bovine animals. The evidence, finally, upon which Koch relied to show that the bovine tubercle could not be transmitted to men was indirect and not at all conclusive. Even if it be admitted that tuberculous intestinal lesions are as rare in children as Koch claims, it is reasonably true that *tabes mesenterica* is found in a considerable number of children dead of tuberculous disease without tuberculosis in any other part of the body. The inevitable interpretation of these cases is that the tubercle bacillus passed through the intestinal mucosa without causing lesions at the portal of entrance. The same thing has been shown to occur even with the typhoid bacillus. If these views are correct, Koch's main argument falls to the ground.

Prof. E. Nocard also offered some criticisms. After explaining that he had repeatedly and recently stated that bovine tuberculosis plays a smaller part in the spread of tuberculosis than is believed, he continued that it would be a great mistake to leave bovine tuberculosis out of consideration entirely. Koch stated, after showing that he had failed to produce tuberculosis in cattle by various methods with material from human sources, that cattle are refractory to human tuberculosis. Further, he stated that man has little to fear from tuberculosis of cattle. While professing all respect for the authority of Prof. Koch, Nocard most positively asserts that the experiments do not justify such a conclusion. Negative results cannot outweigh the positive facts, and there are positive facts proving the possibility of infecting cattle with tuberculous material from man. He refers to the experiments of Prof. Chauveau. Among these there were 4 in which calves of from 5 to 10 months of age were infected in various ways with tuberculous matter from man. These 4 animals were killed at different times up to 59 days, and at the autopsy tuberculous lesions were discovered. These experiments, he admits, were done before the tuberculin test was known, and the selection of positively nontuberculous calves could not be so certain. Therefore, Chauveau chose young calves, as tuberculosis is so extremely rare at that age. Further, he obtained the calves from districts where tuberculosis of the cows is unknown, and the control calves of the same age and origin killed at the same time were healthy. Nocard then goes on to state that it is no new fact in pathology that an identical disease may become difficult of transmission from one species of animals to another susceptible to that disease on account of adaptation and other processes. He refers to some of his own experiments in this direction. With regard to the possibility of infection of man by milk and by direct inoculation, he refers to cases of veterinarians who have become infected at autopsies on tuberculous cows. Among these, Gentian, of Copenhagen, was one who recovered; Moses, of Weimar, and Thomas Walley, of Edinburgh, on the other hand, succumbed.

McFadyean, of London, also answered the arguments of Koch. He summarizes Koch's arguments under three heads: (1) The bacilli in bovine tuberculosis are more virulent for cattle and other domestic quadrupeds than human tubercle bacilli. (2) The difference is so

marked and constant that it may be accepted as a distinguishing characteristic, even assuming that the bovine bacilli may occasionally be found the cause of disease in man. (3) If bovine bacilli are capable of causing the disease in man, there are abundant opportunities for infection, and primary tuberculosis of the intestines ought to be common. Postmortem experience, however, shows that it is not common; therefore it must be concluded that the human subject is immune or so slightly susceptible as to make it unnecessary to institute precautions. McFadyean holds that one of the premises in this argument is not well founded and that the others have little or no bearing on the question, and that there still remain reasonable grounds for regarding tuberculous cows' milk as distinctly dangerous to human beings. He admits that the bovine bacilli are more virulent for cattle and other domestic animals than human bacilli, but it cannot be admitted that the low virulence of human bacilli for cattle makes it probable that bovine bacilli are only feebly pathogenic for man. The bovine bacilli are virulent for very diverse species of animals; in fact, for almost every quadruped on which they have been tried. It is well known that the majority of disease-exciting bacteria are harmful to only one or two species, but all of those that are virulent for all the domestic animals are also pathogenic for man. With regard to the view that the difference between bovine and human bacilli in respect to virulence for cattle is so fixed that it may be relied upon as a distinguishing characteristic, he holds this entirely unproved. There are great differences of virulence of the tubercle bacilli in animals of the same species, and if low virulence for cattle is the distinguishing feature, then it could be easily shown that certain cases of tuberculosis in animals were of human origin. The third point raised by Koch is the only one really germane to the issue. Koch states that the cases are extremely rare in which infection of the intestines has occurred from milk or meat, and he refers to several large series of postmortem observations that appear to justify his statement, and says that he could have cited many more. Even if it were admitted that primary tuberculosis of the intestines is rare and that cases of infection through milk are still rarer, it would still be advisable to take measures to prevent these few cases. The statistics, however, are not uniform, and the English statistics differ from those obtained in Germany. George Still, at the Hospital for Sick Children of London, and Shennan, at the Royal Hospital for Sick Children in Edinburgh, have gathered interesting figures. Still concluded that in 29.1% of the cases of tuberculosis of children the primary infection appeared to have taken place through the intestines, and Shennan arrived at an almost identical conclusion—28.1%. The number of cases dealt with in the two series was 547, and the postmortem appearances were dealt with in an unexceptional manner. McFadyean then refers to recorded instances in which the direct relationship of cause and effect between milk and human tuberculosis seemed to be established. Such evidence, of course, must be scanty, and few of the records can be regarded as convincing. He refers to the

lecture of Sir Richard Thorne, who expressed the conviction that the infection by milk was the main cause of tabes in children.

Prof. Thomassen, of Utrecht, in discussing the communicability of tuberculosis of man to cattle, refers to his own experiments. The results obtained by Theobald Smith in 1898 induced him to make similar experiments. In his first experiment 2 calves were used, one 8 and the other 4 weeks old. They were tested with tuberculin without result and were then fed with milk from a cow that did not react to tuberculin. The calf aged 8 weeks was inoculated in the abdomen with glycerinized potato culture of human tubercle bacilli. The culture was known to be virulent for the rabbit and guinea-pig. After a few weeks, during which it remained in apparent health, it developed fever and then reacted with tuberculin. The calf was slaughtered later, but a most minute postmortem examination failed to discover any lesions. In the case of the second calf the culture was introduced into the anterior chamber of the eye. Intense keratitis developed and the changes in the eye could not be observed. The animal sickened with enteritis, but later was tested with tuberculin and did not react. Later it was killed and was found to be the subject of generalized tuberculosis, and the eyeball was found to contain tuberculous lesions and tubercle bacilli. The lymphatic glands on the same side were indurated and showed miliary tubercles. The lungs also contained miliary tubercles and some gray fibrous nodules of larger size. Subsequently, a 2-year-old heifer was used for experiment. It had not reacted with tuberculin and was inoculated through the trachea with a culture on potato. The culture had been obtained from a tuberculous kidney of a man. The animal was tested later with tuberculin, the reaction not exceeding 1°C . (The initial reaction had been 0.5°C .) The inoculation had not been followed by symptoms. A month and a half after the first inoculation a second injection was made into the larynx and another into the abdomen. A small quantity of the injection in the latter situation escaped into the muscles of the flank, and on the following day the temperature rose to 40.3°C . and the animal became very sick, but recovered in a few days, having then a firm tumor in the flank. After 3 weeks this was opened and purulent matter escaped from a thickened capsule. The discharge was rich in specific bacilli. Some months later the tuberculin test was applied without reaction. The animal was killed and no tuberculous lesions could be discovered. A fourth heifer of 2 years, also tested with tuberculin, was inoculated in the anterior chamber of the eye with human bacilli. The cornea became somewhat opaque. Two days later an exudate in the anterior chamber developed. Nineteen days after the inoculation the animal was very ill, the temperature registering from 40.4°C . to 40.6°C . The eyeball had increased to double its size. Two months later the tuberculin test gave a reaction of 1.3°C . Three months later the animal was killed and tuberculous lesions in the eye were discovered and some tubercles in one of the bronchial glands. These lesions, however, were unfortunately not examined. He concludes that it is difficult, but not impossible, to set up

generalized tuberculosis in the bovine animal from pure cultures of bacilli obtained from the human subject. **The identity of the two diseases is still firmly established, and the danger of infection from cow to man is more likely to occur than the reciprocal infection and must be taken into account.** Contrary to Koch's pronouncement, the generally admitted higher virulence of bovine bacilli justifies the strict supervision of our milk and meat supply.

Among other resolutions adopted at the end of the Congress were these: (1) That tuberculous sputum is the main agent for the conveyance of the virus of tuberculosis from man to man and that indiscriminate spitting should therefore be suppressed. (2) That in the opinion of this Congress, and in the light of the work that has been presented at its sittings, medical officers of health should continue to use all the powers at their disposal and relax no effort to prevent the spread of tuberculosis by milk and meat. (3) That in view of the doubts thrown on the identity of the human and bovine tuberculosis it is expedient that the government be approached and requested to institute an immediate inquiry into this question, which is of vital importance to the public health and of great consequence to agricultural industry.

The most conclusive evidence offered in opposition to the views of Koch was that supplied by Ravenel, of Philadelphia. In his discussion, and especially in his paper¹ read before the Pathological Section of the Congress, he referred to experiments which absolutely disproved the statements of Koch regarding the transmissibility of human tuberculosis to cattle and other animals. These experiments, which were reported in great detail, showed (1) that the tubercle bacillus from bovine sources has in culture fairly constant and persistent characteristics of growth and morphology, by which it may tentatively be distinguished from that ordinarily found in man; (2) that cultures from the two sources differ markedly in pathogenic power, affording further means of differentiation, the bovine bacillus being very much more active than the human for all species of experimental animals tested, with the possible exception of swine, which are highly susceptible to both; (3) that tuberculous material from cattle and from man corresponds closely in comparative pathogenic power to pure cultures of the tubercle bacillus from the two sources, for all animals tested; (4) that it is a fair assumption, from the evidence at hand and in the absence of evidence to the contrary, that the bovine tubercle bacillus has a high degree of pathogenic power for man also, which is especially manifest in the early years of life.

The same author² previously reported some interesting results of an investigation on the **dissemination of tubercle bacilli by cows** in coughing. He used a contrivance resembling a muzzle over the mouth and nostrils and examined the material obtained in specially prepared receptacles. His studies showed that small particles were projected in the act of coughing and that these contained bacilli which could be discovered in the direct

¹ Univ. of Penna. Med. Bull., Sept., 1901.

² Jour. Comparative Med., Jan., 1901.

examination as well as in inoculation. In 34 examinations made in 5 animals, the bacilli were demonstrated 20 times by microscopic examination. Their number was very variable, but one of the animals discharged mucus as rich in bacilli as the human sputum showing an advanced tuberculosis. Of 45 guinea-pigs inoculated with these products, 23 died of peritonitis before the appearance of tuberculous lesions, and of the 22 surviving, 11 developed tuberculosis.

Ravenel¹ also reports 3 cases of tuberculosis of the skin due to inoculation with bovine tubercle bacilli. The first case was a veterinarian at the University of Pennsylvania, who in 1896 injured his finger at an autopsy on a tuberculous cow. A nodule appeared and this tended toward subsequent ulceration. The tissues were excised after some weeks and examined, but probably on account of prolonged exposure to alcohol he was not able to demonstrate the bacilli, but the histology of the lesions left no doubt of the tuberculous nature. The second case was an assistant who was similarly injured in making an autopsy on a goat which had succumbed to experimental tuberculosis of bovine origin. The wound, washed with sublimate, healed, but after 3 weeks the region swelled and became painful and red. Excision was practised and 2 guinea-pigs were inoculated. Sections of the tissue showed neither giant cells nor bacilli, but the guinea-pigs presented lesions of general tuberculosis. The third observation was a veterinarian who was injured at an autopsy on a tuberculous cow. He developed a painful swelling 3 or 4 weeks later. Portions were excised and the histologic examination showed the presence of tubercle bacilli in the sections. In all cases the infection remained localized, but the author is convinced that the relative benignity is due to the mode of inoculation more than to the character of the micro-organism. Up to the time of this report there were only two definite observations of direct inoculation from cattle to men, the cases of Tscherning and of Pfeiffer. In one of these infection was followed by general and fatal tuberculosis. Experimental results of the authors go to show that the bovine bacillus is at least as virulent as the human. [This contribution, together with the more recent report of the same author, is of great importance in demonstrating that there is unquestionably danger to man from bovine tuberculosis, and is sufficient of itself to quiet the outcries of laymen who are commercially interested in the removal of restrictions upon the sale of food which may be tuberculous.]

F. Friedmann² describes some extremely interesting results from experiments concerning the possibility of the transmission of tuberculosis through the semen. He notes that it is necessary, in demonstrating such a possibility, to show that there was no opportunity for infection of the embryo through disease in the mother, and that it is essential to show that tubercle bacilli are present in the semen. The former point has not yet been positively demonstrated, though it has been strongly suspected in a number of cases. His experiments consisted of the injection of a dilute suspension of tubercle bacilli into

¹ Veterinarian, Oct., 1900.

² Deut. med. Woch., Feb. 28, 1901.

the vaginas of healthy female guinea-pigs immediately after copulation, the injections being carried out by means of a syringe to which was attached a needle about the length of the penis of the male. About an hour after the injection the fluid in the neighborhood of the cervix of the female was examined, and showed large numbers of spermatozoa with occasional tubercle bacilli. The females were killed during the first week of pregnancy. The most satisfactory results were obtained when the animals were killed about the sixth day. In such instances he found with practical constancy that serial sections of the embryo showed tubercle bacilli. In one embryo he found an actual nest of tubercle bacilli. The mothers did not in any instance show invasion by the tubercle bacilli, and placenta and maternal membranes were absent at this time; hence there was no possibility of infection through these structures. He compares this result with the fairly frequent clinical observation of tuberculosis in young children whose fathers show advanced tuberculosis, but whose mothers appear to be healthy. There is also a close similarity to his results in the frequent observation that the mothers of syphilitic children are apparently healthy while the fathers show actual disease. Friedmann states that he is carrying on further experiments to determine the manner in which the tubercle bacilli lodge in the embryo. Since they are nonmotile, an explanation is rather difficult to give, but he thinks that it may be possible in animals suited to such work to determine that they actually enter with the spermatozoa. He considers, at any rate, that he has shown the very ready possibility of a tuberculous infection taking place coincidentally with fructification. He admits that he introduced many more bacilli than would ever be introduced by natural methods; he did this, however, in order to determine in the early part of his work whether infection after this manner is possible, and thinks that smaller numbers will produce the same results. [The experiments are not wholly convincing, as the author admits, and confirmation from other sources would be useful. But they constitute the most interesting and important testimony of the possibility of frequent direct infection from the father that has yet been offered.]

Friedmann¹ also reports in a prize essay his results from the examination of tonsils obtained in 91 instances by postmortem examination, and in 54 cases by extirpation during life. These tonsils were all examined by bacteriologic and histologic methods, and with one exception were taken from children younger than 5 years of age. The results are used to show the importance of the tonsils as portals of entry of tubercle bacilli and in the production of general local tuberculosis. Descriptions of the individual cases are given. The general results were as follows: In the 91 postmortem cases 37 instances worthy of discussion were found. In 1 case the tonsils were riddled with tubercle and showed large numbers of bacilli, and were the only seat of tuberculosis to be found in the body. There were 4, and perhaps 5, other cases in which the tonsillar tuberculosis was in all probability the primary seat of the

¹ Zeigler's Beitr., Bd. XXVIII, H. 1.

disease. It was partly complicated by secondary involvement of the glands, intestines, and bones. In 7 other cases the tonsils showed typical giant cells, but no bacilli were found. In 2 other cases there was tonsillar tubercleulosis which was probably not primary. In 3 other cases giant cells were found, but the condition was certainly not tuberculosis. In 8 cases of general tuberculosis there were no tubercles in the tonsils, but there were old scars which were probably the result of an early tuberculosis; and similar, though less distinctive, conditions were found in two further cases. Four cases showed tuberculosis of the internal organs without any tuberculosis of the tonsils. In 3 cases there were no tubercular changes in the tonsils, and yet tubercle bacilli were found in smears made from the surface of the tonsils, an evidence that in these cases animal experiments made after the usual methods would have given false results. There were much less striking results from the investigation of the 54 cases of extirpation of the tonsils during life. In only 1 instance could tuberculosis be definitely shown to be present, and this was probably not primary. Friedmann considers that the hypertrophy of the tonsils that occurs in fairly robust children is probably only rarely tuberculous; but his general results showed that **tuberculosis of the tonsils is by no means a rarity**. As to the method of infection, he mentions the possibility that this may take place through the lymph and blood channels, through inhalation, and through food. Infection through the blood and lymph channels is of course excluded in primary tuberculosis, though it occasionally may occur in secondary disease. Infection through inhalation is improbable in most instances, and Friedmann thinks that primary tuberculosis is usually set up by infection through the food.

Rethi¹ found **bacilli in the tonsils** but 6 times out of 100 cases examined. Both he and Friedmann consider tuberculosis of the lymphatic system usually secondary to pulmonary tuberculosis, while Baup (*ibid.*) has shown that tuberculosis of the tonsil can exist independently of any other tubercular lesion of the body.

B. F. Lyle² reports a case of **congenital tuberculosis**. The mother had advanced tuberculosis at the time of the child's birth and died 2 days later. The child had fever after birth, marked loss of weight and disturbance of the gastrointestinal tract, and died when about 9 weeks old. Tubercular deposits were found in the lungs, spleen, liver, kidneys, and bronchial glands. It was considered that the case was undoubtedly congenital tuberculosis, since the child was removed from danger of infection in the wards. There was no disease of the intestines or mesenteric glands to indicate that the tuberculosis was contracted through the food, and the child was evidently ill at birth. The wide distribution of the deposits, all of which were in about the same stage, indicated a blood infection, and this was thought to be possible only **through the blood of the mother**.

Mosse³ has pointed out the frequency of **pulmonary tuberculosis**

¹ Rev. de la Tuberculose, Feb., 1901.

² Phila. Med. Jour., Aug. 4, 1900.

³ Rev. de la Tuberculose, Feb., 1901.

in children suffering from deviation of the spine. Of 88 children with scoliosis, 60.2% had infiltration of the apex; and 81.5% of 65 children with tubercular disease of the apex had scoliosis. It seems that the lung affected is usually the one on the side of the convexity of the curvature.

It is of interest that Rabinowitsch¹ found in the so-called "**Kindermilch**" of 8 Berlin milk establishments living, virulent tubercle bacilli. The Kindermilch of 3 establishments which continually employed the tuberculin test on all of their cows was found to be free of tubercle bacilli. Cottage-cheese, kephyr and the new artificial butter known as "Sana" were all found to contain tubercle bacilli.

W. Caspari,² after a series of investigations of the milk product called **plasmon**, reports that he was unable to find any tubercle bacilli.

N. W. Jones³ made **cultures from the nasal cavities** of 31 persons who were not connected with laboratories and not associated with tuberculous patients. Cultures were injected into the peritoneal cavity of 31 guinea-pigs. Three guinea-pigs died of tuberculosis; 22 others died of pulmonary lesions of unknown character which gave negative bacteriologic results. The results in general showed that the **tubercle bacillus was present in 10% of these healthy persons**. Two of them were students, and 1 a second-hand furniture dealer. [This result is interesting, but it is a generally recognized fact that most persons are probably inhaling tubercle bacilli daily, and some of these naturally lodge in various parts of the air-passages.]

J. M. Anders⁴ discusses the **hereditary factor in tuberculosis**, and after making allowances for the influences of environment, decides that there is no doubt that there may be inheritance of a predisposition to tuberculosis, the predisposition being most commonly transmitted through the mother. Those who inherit this tendency must be considered to have lack of resistance of the body cells, with imperfect metabolism or nutrition, and a consequent readier susceptibility to infection.

W. Gordon⁵ discusses the relation of the **death-rate from tuberculosis in the rural districts of Devonshire** to various factors. It is not directly related to the general sanitary conditions, but does show a rather irregular relation to the rainfall. This relation is, however, not sufficiently close to explain the variations in mortality in various regions, and Gordon concludes that the chief influence determining the local mortality in tuberculosis of the lungs is the amount of exposure to west and southwest winds.

H. R. Beevor,⁶ after having made an extensive study of the death-rates of tuberculosis in rural communities, decided that **case to case infection is an insignificant factor in country regions**.

C. A. Davies⁷ has investigated the **cause of the severe mortality from tuberculosis in the Isle of Man**. He decides that it is probably in large degree due to consanguinity.

¹ Post-Graduate, Oct., 1900, from Deut. med. Woch., 1900, No. 26.

² Berlin. klin. Woch., Aug. 20, 1900.

⁴ Jour. Am. Med. Assoc., Oct. 20, 1900.

⁶ Brit. Med. Jour., Aug. 18, 1900.

³ Med. Rec., Aug. 25, 1900.

⁵ Brit. Med. Jour., Jan. 12, 1901.

⁷ Brit. Med. Jour., Sept. 29, 1900.

E. B. Borland ¹ urges the **importance of municipal regulation of the spitting habit**. He investigated the regulations of 22 of the principal cities of the United States, and finds that one-half of these have already enacted laws directed toward the regulation of spitting in public places.

Pathology.—W. Ophüls, ² in a study of **pneumonic complications in pulmonary tuberculosis**, discusses the bacteria which he has found in 26 cavities in 13 cases studied. The streptococcus was found alone in 1, the pseudodiphtheria bacillus in 5, the pneumococcus in 6, the last 2 organisms together in 4, the streptococcus and staphylococcus in 2, and the pneumococcus and staphylococcus in 1. The infection is carried from the cavities to other parts of the lung by gravity or by aspiration, or in case the cavity is not well walled off, by granulation tissue or fibrous tissue. Adjacent parts of the lung may be affected by direct extension. In 25 instances among 56 cases of tuberculosis examined he found pneumonic complications. In some instances this was a true tubercular pneumonia. In 9 cases this was acute, in 1 it was chronic, and showed the presence of tuberculous granulation tissue. There may be a more advanced form which is characterized by calcification. A true tuberculous pneumonia is likely to become secondarily infected through the bronchial tubes, and if this occurs, the disintegration of the tuberculous area is favored, and cavities are likely to form rapidly. Tuberculous pneumonias are likely to run a rapid course and to show quick caseation and destruction of tissue, though in some cases there may be considerable fibrous tissue formation. In 16 cases described by Ophüls there was pneumonia due to mixed infection with tubercle bacilli and other organisms, the latter being in 10 cases the pneumococcus. A pneumonia due to mixed infection is much more likely to heal than a pure tuberculous pneumonia, but the cure is likely to be incomplete, a tuberculous lesion remaining. The occurrence of ordinary lobar or lobular pneumonia in tuberculosis is not common. Ophüls has found but 2 cases of bronchopneumonia and 1 of lobar in which tubercle bacilli were absent from the exudate. He has not found proof of a secondary infection of a pure simple pneumonia with tubercle bacilli. Examination of the sputum in determining the nature of a mixed infection is not of much importance, as various pathologic organisms may be found in the sputum without having caused any actual infection.

Symptomatology.—H. Herbert ³ discusses the **trophic changes which occur in tuberculosis**, and which are of clinical importance in the symptomatology and diagnosis. He insists that these often occur on the side of the body corresponding to the diseased lung. Emaciation in tuberculosis is not due to loss of fat only, but to muscular atrophy also, the muscular atrophy being largely unilateral and on the side of the diseased lung. It is perhaps due to reflex nervous influence. The heart also atrophies in tuberculosis and the skin is likely to become dry and scaly, and there is sometimes marked atrophy of the breast on the

¹ Jour. Am. Med. Assoc., Oct. 20, 1900.

² Am. Jour. Med. Sci., July, 1900.

³ Med. News, Sept. 8, 1900.

affected side. There is at times loss of sexual power or increase of sexual desire. There are numerous other symptoms observable in the disease, which lead Herbert to decide that there is a marked degeneration of the trophic nerves in tuberculosis. [It is not difficult to convince one's self that there is unilateral atrophy of the superficial tissues of the chest-wall in many cases, and that this is often on the affected side. We have often demonstrated this to students. It is, however, not of sufficiently regular occurrence and location to be of diagnostic interest.]

Roussell¹ describes certain reflexes which may be present in the early stages of tuberculosis as the idiomuscular reflex, the neuromuscular (flexion of the forearm by contraction of the biceps on percussion of the pectoralis major), and the inhibitory (relative immobility of that half of the chest corresponding to the pulmonary lesion).

S. G. Bonney,² in discussing the tuberculosis problem in Colorado, insists that any impression that tuberculosis has increased in that region since it has become a resort for consumptives is erroneous. The population of Denver, for instance, increased over 50,000 from 1893 to 1899. The number of cases of tuberculosis that developed in Denver was, however, but 4 more than in 1893, and the proportion of cases that had developed in Denver to the total number of deaths from tuberculosis was less than in previous years. He believes that infants and young children dying with tuberculosis can hardly be fairly included in the number of cases of tuberculosis developed in Colorado; nearly one-fourth the cases of tuberculosis developing in Colorado were in children under 5. There is also very little testimony that persons supposed to have contracted the disease in Colorado really did so, and in such cases Bonney found marked inherited taint or some well-defined predisposing cause for the occurrence of the disease. He protests against sending so many advanced cases to Colorado, stating that his statistics show that about 71% of all cases arriving there show involvement of both lungs, and the average preceding duration is about 18 months. He believes that local governments should distribute information concerning the contagiousness and the methods of preventing tuberculosis, but that this should be essentially of a reassuring character, as any stringent measures likely to frighten the populace would do no good and would lead to concealment.

G. Hinsdale³ contributes a study of tuberculosis in Pennsylvania. The deaths within 10 years in this State have been more than 27,000, a number which about equals the death-rate from the most important of the other infectious diseases, together with deaths from inflammation of the gastrointestinal tract. The proportion of deaths from tuberculosis to the general population has gradually decreased in the last 30 years, with the exception of a slight rise in 1899; and the percentage of deaths from tuberculosis of the lungs to the total number of deaths has fallen in 15 years from 14% to 10%, an encouraging observation.

¹ Rev. de la Tuberculose, Feb., 1901. ² Phila. Med. Jour., Oct. 13, 1900.

³ Jour. Am. Med. Assoc., Oct. 20, 1900.

Hinsdale anticipates a still greater reduction of the death-rate from tuberculosis.

Salanone-Ipin¹ has investigated 352 cases of seemingly causeless pleurisy, and finds that about one-third of the cases proved to be tubercular.

Diagnosis.—S. Arloing and P. Courmont² reply to an earlier article by Beck and Rabinowitsch on the serum diagnosis of tuberculosis. They first discuss some of the statements of the latter authors concerning the possibility of the bacillus differing from the actual tubercle bacillus; and also the contention that the agglutination differs greatly from that observed in cholera and typhoid fever. As to the bacillus, they state that it was derived from the ordinary Koch bacillus, and that it caused tubercles, though the circumstances under which it produced this result differed from those that are common. As to the agglutination, they note that agglutination is a phenomenon which differs greatly according to the cultures used and to the activity of the serum under investigation, and that it is not necessary for different sera and different organisms to show exactly the same result in order that the effect may be considered conclusive. They then report some results from the investigation of cattle; 80 calves, which were found to be not tuberculous upon subsequent autopsy by inspectors who knew nothing of the results of the serum reaction, gave a negative result to the serum reaction in every case; 70 older cattle, which showed tubercular deposits, gave in every case, with one exception, a reaction in a dilution as great as 1 to 10. They do not claim that the serum reaction may be absolutely depended upon in every case; they do, however, consider that it is a valuable aid in diagnosis. They give an interesting criticism of the tables presented by Beck and Rabinowitsch, which, while somewhat caustic, seems just if their statements are exact. Beck and Rabinowitsch stated that in 73 cases they compared the results of tuberculin injection with the serum reaction, and they use the results to show the lack of value in the serum reaction. Arloing and Courmont point out that in 61 of these cases there is a dash in the tuberculin reaction column, which either indicates that the tuberculin reaction was not carried out in these cases or was negative. If the first were true, there was no real comparison between the tuberculin reaction and the serum reaction. If the tuberculin reaction was negative, it merely shows that in the cases that were proved to be tuberculosis the serum reaction was positive in more cases than was the tuberculin reaction. Were this the case they state that they are quite content to rest upon the results obtained by Beck and Rabinowitsch.

M. Beck and Lydia Rabinowitsch³ reply that the criticism of their tables was due to careless reading of the legends published with the tables. They then refer to the work of a series of other writers who have found the serum reaction for tuberculosis practically useless, and in reply to the work of Arloing and Courmont on tuberculosis in cattle,

¹ Rev. de la Tuberculose, Feb., 1901. ² Deut. med. Woch., Nov. 29, 1900.

³ Deut. med. Woch., Mar. 7, 1901.

publish a series of six tables of results obtained in healthy cattle, in animals with other affections than tuberculosis, in those with very early tuberculosis, in others with moderately early tuberculosis, in some with moderately advanced tuberculosis, and in a final series with advanced tuberculosis. They claim that the tables now presented show that the reaction is worthless in tuberculosis of cattle. For instance, in 19 healthy animals the reaction was positive in all but one case in a dilution of 1 to 5; in 2 of the 18 it was somewhat doubtful, and in the other 16 it was certainly positive. It was positive in a dilution of 1 to 10 in more than half these animals, and in nearly half in a dilution of 1 to 20. It was positive in 5 in a dilution of 1 to 30, and in 1 in a dilution of 1 to 40; and in the latter dilution it was doubtful in 2 more cases. The results were positive in most of the animals showing other affections than tuberculosis, while the results in animals with tuberculosis were almost the same as in those without. The diagnoses were confirmed by autopsy. They make the positive statement that they followed the method exactly as described by Arloing and Courmont, and state once more that they **consider the reaction wholly worthless in diagnosis.**

Horeicka,¹ after a study of the serum diagnosis of tuberculosis, decides that a negative result of the reaction is not sufficient to exclude tuberculosis, and that in general the **results of the reaction are not trustworthy.**

Dubart² has been able to produce cultures of the tubercle bacillus, following the **method of Ferran**, that gave useful results in the application of the serum test for this disease. The other investigators who have reported upon this method used cultures obtained from Arloing and Courmont. [While a final conclusion as to the possible value of the serum test cannot yet be reached, it seems probable, from a consideration of the various reports, that it yields irregular results, and if it has any value it is only when it is used by those thoroughly conversant with the technic which Arloing and Courmont themselves employ. In general the evidence is rather against the usefulness of the test, but some of this evidence has been presented with such evident preconception of the unreliability of the procedure that it must be received with some skepticism.]

Bogaert and Klymens,³ in discussing the early diagnosis of tuberculosis, insist upon the **diagnostic value of tuberculin**; they also note that when women show an extreme degree of sensitiveness to various external influences during the period of menstruation, this should give rise to a suspicion of tuberculosis.

Levy and Bruns⁴ have often been able to **diagnositicate tuberculosis by means of tuberculin** when neither physical examination nor sputum gave any indication of disease. Fraenkel⁴ insists upon the incoquity of this method of diagnosis. Mettetal⁴ advises, in young children, the injection of 1 milligram of tuberculin at first, increasing

¹ Hyg. Rundschau.

² Congrès pour l'étude de la Tuberculose, 1898.

³ Zeit. f. Tuberkulose u. Heilstättenwesen, II. 3.

⁴ Rev. de la Tuberculose, Feb., 1901.

to as much as 3 milligrams if necessary. Brieger and Neufeld¹ have shown that the tubercle bacillus may not be found in tubercular sputum till the disease is far advanced, and consider that the use of tuberculin is a safe and reliable method of diagnosis.

H. Hellendall² has attempted to provide a new and more rapid method of diagnosis of tubercular meningitis by injecting cerebrospinal fluid from suspected cases into the spinal canals of guinea-pigs, hoping in this way to produce a rapid tubercular meningitis in the guinea-pigs. The results apparently showed the impossibility of using the method in this way, but demonstrated some surprising facts. The central nervous organs remained entirely free from tuberculosis, but a general miliary tuberculosis of the other organs was produced by fluid which contained tubercle bacilli. Hellendall thinks, therefore, that this method may have some value both because the animals died more rapidly than is customary with experimental tuberculosis, and because smaller quantities of cerebrospinal fluid can be used. By this method 2 cc. suffices, while 4 cc. is necessary by the intraperitoneal method, and it is often difficult to obtain the latter amount during life.

J. Ferran³ suggests a new method for the diagnosis of tuberculosis. He states that there is a saprophytic form of bacillus found in the lungs in tuberculosis which has the property of producing spermin. If tubercle bacilli are not found by the microscope, he advises placing 3 cc. or 4 cc. of sputum in a sterilized vessel, adding 10 cc. of blood-serum, and placing in the incubator for 36 hours. The characteristic odor of spermin is noticed after this time, and this indicates the presence of tubercle bacilli.

Benvenuti⁴ describes the presence of the pseudotubercle bacillus in cases of gangrene of the lung. The organism was a saprophyte, of the same character as that described by Rabinowitsch in gangrene of the lung, and by others in butter, in feces, and very commonly in smegma. Benvenuti considers that this organism probably played an active role in the production of the gangrene, however, and is inclined to consider that the infection was derived from the gastrointestinal tract because of the large amount of indol produced by cultures in bouillon.

L. Michaelis⁵ recommends the use of Weigert's elastic stain with the sputum in cases of suspected tuberculosis. He considers that one may often make the diagnosis in this way when it is impossible by other methods. He smears the sputum on slides and places the slides in a cylindric vessel containing Weigert's stain, after allowing them to dry in the air. The alcohol of the staining solution fixes the sputum, and other fixatives should not be used. After about a half hour the preparation is taken from the stain, washed with water and then with 3% HCl alcohol until practically colorless. He then covers it

¹ Rev. de la Tuberculose, Feb., 1901. ² Deut. med. Woch., Mar. 28, 1901.

³ Zeit. f. Tuberkulose u. Heilstättenwesen, 1900, H. 3.

⁴ Gaz. degli Ospedali e delle Cliniche, 1900, No. 41.

⁵ Deut. med. Woch., Apr. 4, 1901.

with cedar oil and examines it directly. The elastic fibers show a dark violet color. He has also found that the iron chlorid in Weigert's method can be replaced by other substances which cause oxidation; ammonium persulphate was very satisfactory. Other substances, such as orcin and pyrogallol, could be used instead of resorcin, and a large number of stains could be used instead of fuchsin. Then various combinations gave different colors to the elastic tissue. He also learned that various aromatic bases which are colorless, such as hydrochlorid of anilin, dimethylanilin, and paratoluidin, can be used instead of basic dyes.

May¹ describes a method for the recognition of elastic fibers in the sputum by the use of orcein stain. The sputum is mixed with equal parts of 10% potassium hydrate and warmed over the water-bath until in solution. After centrifugation and pouring off the supernatant fluid, 2 cc. of Unna's orcein solution is added to the sediment, and hydrochloric acid is then added until the cherry red color returns. He then places the tube in boiling water, decolorizes the sediment in hydrochloric acid and alcohol, and again centrifugates. Examination with the microscope will then show the elastic fibers stained a reddish-violet color. Other connective tissues are but faintly, if at all, stained.

Robin and Binet² contribute an interesting study of the respiratory exchange in cases of incipient and advanced tuberculosis as well as in those predisposed to tuberculosis. These investigations, if confirmed, may add another to the methods of early diagnosis. Among the conditions involved in tuberculous diathesis are a demineralization, to which Robin has previously directed attention, and a modification of the respiratory exchange, which is the subject of the present study. **Contrary to the usual belief that the respirations are diminished as a result of pulmonary tuberculosis, the authors find a decided increase.** Among 162 cases of tuberculosis they have found that the exception to this rule is but 8%, and in these exceptional cases the reduction in respiratory exchange was a transitory matter. Their investigations have shown an increase of the respiratory movements amounting to 110% in women and 80.5% in men. The amount of carbonic acid exhaled per minute and per kilogram per weight increased 86% in women and 64% in men. The total oxygen consumption increased 100.5% in women and 70% in men. The oxygen absorbed by the tissues and not converted into carbonic acid gas increased 162.8% in women and 94.8% in men. This increase in respiratory exchange was not entirely a relative matter and explainable by the decreased weight of the patient, but was actual, as the figures of the total intake and output show. The respiratory irregularities noted occurred in acute as well as chronic tuberculosis, and at all stages of the disease. It was also present in Potts' disease, in other forms of osseous tuberculosis, tuberculous pleurisy, and adenitis, but when the lungs were not affected, the respiratory exchange remained little above the normal. In meningitis and tuberculous peritonitis there was no increase. The constancy of this altera-

¹ Deut. Arch. f. klin. Med., Nov. 1, 1900.

² Bull. de l'Acad. de Méd., Mar. 19, 1901.

tion is such that the authors feel it **may be looked upon as a diagnostic indication.** They have investigated a number of diseases to determine the conditions in these with a view to estimating the diagnostic value of the test. They found the respiratory exchange diminished in typhoid fever, simple pleurisy, bronchitis with emphysema, enteritis, cirrhosis of the liver, cardiac diseases, and myxedema. There may be slight increase, but not so great as in tuberculosis, in nephritis, diabetes, and hemophilia. In exophthalmic goiter there is considerable increase, often more than in tuberculosis. Several experiments and some clinical cases have shown them that the **increased respiratory exchange occurs in those predisposed to tuberculosis, but not yet actually affected.** For example, they have found cases of infants having an inherited tendency who have shown this sign and have later developed tuberculosis, while members of the same family, not showing this sign, have remained healthy. They are not as yet in position to assert whether the condition is an act of defense against the disease or the result of the increased activity caused by the bacillary invasion, though they incline to the latter view.

Hirtz and Brouardel¹ have shown that there is a **difference between the normal pneumographic tracings** and those made with patients suffering from pulmonary tuberculosis.

Giovanni² has drawn attention to the **development of the right ventricle out of proportion to the volume of the heart** as a valuable sign of predisposition to tuberculosis in children above 10 years of age. Aplasia of the arterial system in contrast to an augmented development of the veins and lymphatics is regarded in the same way.

Prognosis.—R. Maguire,³ in discussing prognosis and treatment in pulmonary tuberculosis, mentions a case that had been observed for 15 years, and had had during the entire time signs of cavities in the lungs, with good general health. **The most favorable physical signs** are mere lack of resonance, with deficiency of movement and breath-sounds, but without adventitious sounds. The occurrence of rales makes the prognosis decidedly worse, but fine rales are much more favorable than those of coarse quality. The prognosis becomes correspondingly grave, with increase in the dullness. The disease is more favorable when situated at the apex than in the less common cases when it occurs in the middle lobe. Primary multiple lesions are of unfavorable prognosis. One type described by Maguire, and termed that of “multiple pleuritic onset,” he considers very unfavorable; in the early stages in such cases the only physical signs are occasional pleuritic rales. If there is a tendency to hectic fever in these cases, the course is likely to be very rapid. Another bad form is that in which there are marked signs of emphysema without any other notable signs at first, but with rapid emaciation. The subsequent course in these patients also is likely to be rapid. As a general rule, **if the symptoms are out of proportion to the physical signs, the prognosis is bad.** In such cases there is often at the end a rapid

¹ Rev. de la Tuberculose, Feb., 1901.

² Rev. de la Tuberculose, Feb., 1901.

³ Brit. Med. Jour., Dec. 1 and 8, 1900.

outbreak of widespread signs and early death. He calls such cases "latent" pulmonary tuberculosis. Anemic patients are likely to show a more favorable course than florid patients. Deformity of the chest is unfavorable. The disease is generally rather slow in those persons who have tuberculous glands, and Maguire objects to the attempt to reduce such glands by iodine applications. If surgery cannot be undertaken, he approves of the use of nuclein by the mouth. He does not believe in the removal of pleural effusions which occur during the course of pulmonary tuberculosis unless they cause severe mechanical disturbance. After studying 2000 cases he considers that heredity has been given too important a role in the etiology of the disease. Fever, general weakness, digestive disturbances, and hemoptysis are of great importance in prognosis. A high morning temperature, with lower fever, or none, in the evening, is an unfavorable sign, but is not common. General weakness and gastric disturbance are a bad omen. Gastric disturbance, Maguire thinks, is reflex. As to hemoptysis, repeated small hemorrhages are not infrequently a favorable sign rather than unfavorable, but large hemorrhages are serious. He considers hemoptysis to be not infrequently the result of the overfeeding adopted in the treatment. **The most important sign of softening of the lung** is the large bubbling rale, which he prefers to call the echoing rale, because this name more closely describes its character. He considers that the existence of laryngeal tuberculosis probably always implies the presence of tuberculosis of the lung. Hemoptysis occurring in the second stage is a serious sign. In the third stage, grave symptoms are dyspnea, evidences of heart weakness, and the occurrence of pneumothorax. The latter condition, if unilateral, is most serious at the time of onset because of the shock which occurs.

A. Ott,¹ in a discussion of the **actual importance of eosinophile cells in tuberculous sputum**, reports a series of cases, and concludes that, while there is an indefinite relation between the number of eosinophile cells and the course of the disease, this relation is not seen in most patients, and these cells have therefore **no serious importance in prognosis**. He concludes by describing the case of a young man who was thought to have an apical catarrh because of the existence of rough breathing in the right apex. Tubercle bacilli were absent, but eosinophile cells were present in such large numbers as are seen practically only in asthma; the numbers here were even as great as 75% of all the leukocytes in the sputum. After about 3 weeks bronchial asthma set in with typical attacks and with the presence of characteristic sputum. The signs in the apex were considered to be due to rudimentary asthma. Other authors have directed attention to the fact that other diseases, influenza in particular, may show localization at the apex, and cause unjustified suspicion of tuberculosis.

F. Becker,² in discussing the **prognostic value of the diazo reaction** in tuberculosis, states that his experience with the test indicates that it

¹ Deut. Arch. f. klin. Med., Bd. LXVIII, No. 1 u. 2.

² Münch. med. Woch., Aug. 28, 1900.

is not always an absolutely bad prognostic sign. If it occurs in conditions in which it is usually absent, it is enough to arouse a suspicion of an infectious complication. As an instance of this fact he notes that in one such case chicken-pox occurred, in another a staphylococcus infection.

Treatment—Prophylaxis.—H. Kenwood,¹ in a discussion of the means which may be taken by municipal authorities for the prevention of tuberculosis, apart from the control of milk and meat supplies, reviewed the general means which may be taken, and advised that the medical officers of health should be informed of all deaths from tuberculosis as soon as possible, and that the house where the patient has died should be visited, a hand-bill of advice left, and an offer made to disinfect the house if desired. A system of this kind is in force in Manchester, and hand-bills of information and advice are freely distributed, and placards concerning the disposition of sputum are placed in public rooms and in workrooms, and small fees are paid for notification of cases of tuberculosis. This requires but small expenditure of public money. Kenwood also recommends the exclusion of tuberculous persons, so far as possible, from working in connection with the cooking or selling of food, and when such persons work among others, strict rules should be enforced concerning the disposition of the sputum. He believes in notification, as he thinks the disease can be controlled only in this way, and he considers that the authorities should have power to enforce reasonable measures of control of the sick if their friends will not do it themselves.

De la Camp² discusses the results of treatment of tuberculosis of the lungs for the past twenty years in the St. George Hospital and in the Eppendorf General Hospital in Hamburg. He excludes, in his report, patients who had died from other causes, and those who had not yet reached the end of their fifteenth year of life. There were in all 8406 cases, 78.2% being males. The general results showed that the largest number of cases was observed in persons between 20 and 35 years of age; the largest number of deaths occurred between 30 and 35 years; the largest number of cases discharged unimproved occurred in patients between 25 and 30; the largest number of those improved, between 20 and 25. The chief points referred to in the study of the results are the influence of fever and of the changes in the patients' weight. It is notable that among the whole group of those that were taken in with fever and discharged free from fever, 65% were in the class called improved; and of the number of patients discharged distinctly improved, it was noted that 33% had fever when they came in and had no fever when discharged. The most marked increase in weight was usually noted about the seventh week of treatment, and it is insisted that patients must be subjected to about 2 months' treatment if they are to show any satisfactory increase in weight. No marked influence was observed with any form of medication.

¹ Brit. Med. Jour., Aug. 18, 1900.

² Mittheil. aus dem Hamburger Staatskrankenanstalten, Bd. II, 1900.

W. H. Swan,¹ in discussing the **causes of failure in the climatic treatment** of tuberculosis, refers to the fact, which he considers but too little understood, that the climate of Colorado is both stimulating and exhausting, the patient fatiguing readily, but being exhilarated by the atmosphere and spurred on to overexert himself. There is often a dangerously rapid advancement of the disease at first. Swan insists that patients must not be sent to Colorado if their disease is far advanced unless the journey does not involve serious fatigue and unless they can give themselves over solely to the acquirement of health for a long time. Early cases should not be sent unless they have some means of living under proper hygienic conditions for at least 3 or 4 months, without attempting to do much toward earning a livelihood for that time and perhaps for even longer. The patient should in all cases be instructed to keep quiet and to rest until he is advised by a physician to increase exercise and to begin work.

J. F. Little and F. W. Forbes Ross,² as an example of the influence that **open-air treatment at home** may have when change of climate and other methods have failed, report the case of a man of 24 who was sent to South Africa because of tuberculosis, but did not improve. He returned to England greatly emaciated, with signs of cavity in one apex, consolidation on both sides, and tuberculosis of the larynx, with large numbers of bacilli in the sputum. He was given open-air treatment at home, and rapidly gained in weight and in general condition, and the treatment was continued in an institution for some months. The patient had become practically entirely well.

C. E. Edson³ insists upon the **importance of rest** in the treatment of the more advanced stages of pulmonary tuberculosis. It is particularly important in the treatment of fever, and he believes acts by diminishing the activity and depth of respiration, thus giving more opportunity for rest of the lungs.

J. H. Kellogg,⁴ in continuing discussion of the **cold-water treatment** of tuberculosis, states that the applications should never be made when the patient feels chilled, but that at first they should be made only over local areas until the patient becomes accustomed to the treatment, after which the whole surface may be treated at once. The duration of the baths and the temperature at which they are used must be determined by the general condition and the reaction of each individual. If it is desired to lower the temperature, the measures used should be very mild or chills will be produced. If there are any unfavorable signs during the course of treatment, the treatment should be made milder. Kellogg finds that hydrotherapy prolongs life and makes the patient more comfortable. In the treatment of cough he recommends the sipping of hot water. Expectoration is promoted by drinking a good deal of hot water and by rubbing the chest, or by wearing a hot-water bag over the chest. Pain is often relieved by warmth to the chest, hemorrhage by cold to the chest and heat to the extremities. Dyspnea is often

¹ Boston M. and S. Jour., Nov. 1, 1900.

² Lancet, Dec. 1, 1900.

³ Med. News, Oct. 27, 1900.

⁴ Med. News, Nov. 17, 1900.

relieved by hot applications to the spine, and irritation of the throat is sometimes improved by a throat bag. Night sweats he treats by sponging with hot water at bedtime; fever, by a prolonged bath at a temperature of 92° to 98° F. Diarrhea is improved by hot fomentations over the abdomen; vomiting, by cold compresses. As to the general results of this treatment at the sanatorium, he states that of 240 patients, 160 have been either cured or decidedly improved, while 80 were relieved, and he enthusiastically recommends the treatment.

J. Hericourt¹ reports 35 cases of tuberculosis in which the **treatment with fresh meat-juice**, as advocated by Richef and himself on experimental grounds, was used with good effect. In part these cases are personal observations, in part they are communications from various sources in Belgium, Switzerland, Italy, and France. The results were apparently very favorable in all of the cases. Excepting in certain cachectic persons in the last stages, the administration of the meat-juice has been well borne. Sometimes intestinal troubles have been caused, but these are the result of improper preparation of the material. In general, the results of treatment in advanced stages of the disease are not satisfactory. Referring to the practical side, the author gives in detail the method of preparation of the juice. He takes fresh beef, well chopped, and macerates for 2 hours with one-fifth of the quantity of pure cold water, sterilized if necessary. Afterward the juice is expressed in a meat-press. The dose of the liquid varies with the gravity and stage of the disease. For a case of latent tuberculosis, or one in the first stage, he gives 500 to 1000 grams; for one in the second stage, from 1000 to 2000 grams; and for a case in the third stage, from 2 to 3 kilos. Taking into account the amount of water added to the meat, he finds that ordinarily from 400 to 500 grams of juice is obtained from a kilo of meat. The juice should be freshly prepared and given unaltered or with the addition of a little salt. Sometimes flavoring substances or effervescing water may be added. The best time of administration is about one-half hour before dinner. In addition to this, a regular diet including fresh uncooked or partially cooked meat is necessary. The danger of invasion of tenias does not seem to him very great. All medicines are suspended during the continuance of this plan of treatment. The duration of the treatment is indefinite, but it is well to continue at least during 6 months after the disappearance of symptoms and the establishment of apparent health, and to return to the treatment for some weeks whenever subsequent health seems to be uncertain.

Richef² contributes an elaborate study of the antagonistic qualities of rare meat and of the muscle serum in tuberculosis. These experiments were conducted on dogs and have shown that the **raw meat and serum have decided antitubercular qualities**. This action is regarded as of antitoxic nature, indirect rather than direct; that is to say, the serum does not contain an antitoxin, but provokes in the tissues, notably in the liver, the formation of an antitoxin. That the action resides in the serum rather than in the substance is shown by the fact

¹ Rev. de la Tuberculose, May, 1901.

² Rev. de la Tuberculose, 1901.

that the muscle juice was as effective as the whole meat. Cooked meats were not effective. Referring to the practical question of therapeutics in man, he insists upon the necessity of sufficient dosage and refers to the inefficacy of any remedy, such, for example, as quinin, if the dose is insufficient. A dose of 750 grams of rare meat is necessary; 500 grams would prove ineffective.

M. Stanton,¹ in discussing the treatment of tuberculosis, states that she has found it possible to persuade tuberculous patients to take considerable amounts of **milk and egg, or other fluid, when the appetite has already been satiated**, without upsetting the stomach or reducing the appetite.

Maguire,² in concluding his lectures, presents a **new method of treating tuberculosis of the lung**, which is suggested with the purpose of rendering the lung as antiseptic as possible. After using a series of substances, he concluded that formaldehyd was a useful germicide, and could be injected into the circulation. He found that he could inject animals intravenously with as much as 2 cc. of a solution of 1 : 2000 (in normal salt solution), within the space of time occupied by five heart-beats, with no unfavorable results. He believed that this would carry to the lungs a solution of about 1 : 500,000, and by working still further he believed that he could wash the lungs with a solution as strong as 1 : 50,000. He administers the injection by placing the solution in a buret, attaching a large hypodermic needle to the lower end by means of a soft rubber tube. At the upper end is a rubber bulb. The patient's arm is prepared as if for venesection, the needle is introduced into a vein, and the flow turned on from the buret. As much as 50 cc. of a 1 : 2000 solution may be injected in a day. Larger amounts are dangerous. Maguire found in using large quantities in his own person that the formaldehyd caused albuminuria and hematuria, and produced thrombosis of the arm vein. He has used this treatment in 70 persons, and finds that it decreases the cough, and makes expectoration freer. He states that practically all of the patients showed improvement, and in some the bacilli disappeared completely from the sputum. [It will be difficult to convince the profession that the treatment is not more dangerous than it is useful.]

Burghart³ has found inhalation of a 2.5 % solution of **formalin**, gradually increased in strength, to be useful in tuberculosis. He thinks **creosote** to be of some value, but has found no drug that can be considered in any sense a specific.

W. Murrell⁴ describes 3 cases of tuberculosis which he treated with **tuberculin R** without improvement. So far as his experience has gone he does not consider this treatment valuable. He prefers inhalations of formalin.

E. Klebs⁵ believes that his **tuberculocidin** furnishes a rational treatment for tuberculosis. He thinks that it can be definitely shown

¹ Med. Rec., Oct. 8, 1900.

² Brit. Med. Jour., Dec. 15, 1900.

³ Berlin. klin. Woch., July 9, 1900.

⁴ Lancet, July 14, 1900.

⁵ Münch. med. Woch., 1900, No. 49.

that it has bactericidal and antitoxic properties. He considers that he has shown by animal experiments that the toxic action of extracts of cultures of tubercle bacilli and of tuberculin can be overcome by tuberculoceidin. He also states that guinea-pigs infected with very virulent tubercle bacilli in large amounts could be almost constantly saved from death by the use of tuberculoceidin. He reports a series of cases which had been observed for as long as 6 to 10 years and which had been treated by tuberculoceidin, and describes results which he thinks may be considered to be cures. The best subjects for this treatment are young persons, particularly those showing so-called scrofulous changes, and in especial tuberculosis of the lymph-glands. He directs attention, however, to the fact that one must always have a special lookout for the complications occurring in tuberculosis, controlling these in order that treatment with tuberculoceidin may be successful.

J. E. Stubbert¹ reports that of 14 incipient cases of tuberculosis which he had 2 years before described as apparently cured, he has found that 9 are still apparently well. He states as a summary of his results in general, that 11% of the cases that have been out of the institution for 3 years have remained cured, 14% of those out for 2 years are apparently cured, and 69% of those out for 1 year are cured. He considers the **serum treatment a useful adjunct** to other treatment.

T. Campbell² describes a case of pulmonary tuberculosis which showed marked septic temperature, and in which **antistreptococcic serum** was used, repeated administrations being given. The only result observed was some increase in fever, and the only conclusion that could be reached was that even if the marked evening rises in temperature are due to pyogenic organisms, antitoxic treatment is not of value.

Fraenkel³ has not had any success in the treatment of tuberculosis by **intravenous injections of an alcoholic solution of cinnamic acid**, though local injections produced marked benefit in lupus. In general the cacodylates have been useful, though in acute cases they may be decidedly detrimental. Petruschky and Klebs³ seem to consider tuberculin T R almost as a specific. Knopf³ vaunts the open-air treatment, with hygiene and diet. Tessier³ has treated tubercular peritonitis by the intraperitoneal injection of filtered air, with 10 recoveries out of 12 cases. He thinks that the contact of air with the tubercular lesions has much to do with the good results often obtained by laparotomy.

R. Simon⁴ discusses the value of **lignosulphite** in tuberculosis of the lung, and describes a method of producing this substance in a form which may be easily inhaled without unfortunate collateral effects. He believes that it has a sterilizing effect when inhaled and also increases the intake of air. He describes as results improvement of the general symptoms, and at first an increase of expectoration; the latter, after the lungs have been completely cleared out, is followed by a decrease in

¹ Med. News, Aug. 18, 1900.

³ Rev. de la Tuberculose, Feb., 1901.

² Brit. Med. Jour., Oct. 20, 1900.

⁴ Therap. Monatshefte, 1900, No. 10.

expectoration and improvement in the physical signs. The effects are dependent upon the condition of the patient; if the destruction of lung tissue is not too far advanced, he considers that it may produce cure in nearly every case. In some cases he found that the lignosulphite had to be stopped after a few days' use, but could be used again after a short time if taken very gradually. Hemoptysis should indicate the cessation of its use.

L. Dannegger,¹ in discussing the use of the same substance, describes a cheap and simple method for providing the proper amount of SO_2 in the air, and for thereby providing the active principle of **lignosulphite**. He considers that the substance does not act as a bactericide, but chiefly through increasing the expectoration and the amplitude of respiration through direct irritation of the lung nerves. Its clinical results he found much less satisfactory than did Simon. He believes that it does cause improvement in tuberculosis, but chiefly in the manner indicated. It is therefore not by any means a specific in the disease, but is **an aid in the treatment of tuberculosis**. The entire effect of lignosulphite he considers dependent upon the amount of SO_2 which it contains.

J. W. Frieser² reports 30 cases which he has treated with **thiocol and sirolin**. The former he recommends particularly in tuberculosis of the lungs, whether in the early or more advanced stages. Sirolin is particularly valuable in chronic nonspecific disease of the respiratory organs, such as chronic bronchitis, emphysema, and asthma. Both were said to act as tonics and to increase the appetite and digestive powers, and sirolin was thought to have a direct action upon the local trouble. It controls cough and acts as an expectorant. Satisfactory points in the drugs are the facts that the taste is pleasing and that they have no unfavorable collateral effects.

Krokiewicz³ has used **hetol** injections in the treatment of tuberculosis. He began with a dose of 0.0005 gram given every 2 to 4 days, and doubled the quantity when circumstances permitted, at every dose. Forty-three persons were so treated; only once was cure established; 11 cases showed decided improvement; 9 showed slight improvement; and 21 showed marked advance of disease and death. He thinks that the treatment is of **relatively little value**, and should be used at most only in the early stages. It should never be used when there is marked fever or hemoptysis.

Cervello⁴ discusses his results from the treatment of tuberculosis of the lungs with **igazol**. Of 55 patients treated, 15 were said to have been completely cured—that is, there was complete disappearance of fever, cough, and night sweats, expectoration had vanished, the lungs seemed normal, and the patients were able to work; 14 were nearly cured; 10 improved; 5 grew worse; 1 remained stationary, and 10 died. Of those that were said to have been cured, 5 were in the first

¹ Deut. Arch. f. klin. Med., Bd. LXVIII, H. 3 u. 4.

² Therap. Monatshefte, Dec., 1900.

³ Wien. klin. Woch., 1900, No. 40.

⁴ Therap. Monatshefte, 1900, No. 8.

stage, 1 moderately severe, 7 severe, and 2 were very ill. Those that were thought to have been cured showed recurrences in some instances, but a repetition of the treatment was said to have caused complete recovery. He believes that the treatment is capable of producing at least a pause in the advance of the disease and of prolonging the lives of tuberculous subjects.

Tomasselli ¹ has used **igazol** in the treatment of tuberculosis and decides that it has the most satisfactory effect of all the gaseous antiseptics as yet used on the respiratory tract. He believes that the treatment is indicated in cases of tuberculosis that are not markedly febrile and not very far advanced. He has used the treatment in 17 cases with improvement in the milder cases, but without any effect in those more advanced. The inhalations were given for 2 hours per day and the amount used was increased to 8 grams daily.

N. E. Norway ² describes a case of **tuberculosis of the lungs complicated by hip-joint disease** in which he used **igazol** with marked improvement.

Schaefer ³ reports a series of about 260 cases of tuberculosis treated with **ichthyol**. He administers it in mineral water, beginning with 15 drops 3 times a day and increasing it to as high as 80 drops a day. It is mixed with equal parts of water and then mixed with warm milk, or some similar substance, to cover the taste. If the taste remains in the mouth, it may be gotten rid of by washing the mouth with a peppermint or menthol solution, or by chewing rye bread. If any disturbance of the stomach occurs, it can usually be controlled by giving peppermint tablets. He observed no very bad results from its use, and found that the effects upon the tuberculous process were very satisfactory, the general condition being improved, expectoration easier, and the bacilli becoming reduced in number. The results in bronchiectasis also were good.

Harper ⁴ advocates treatment of tuberculosis with **urea**, and dieting such patients on food rich with urea, such as kidney, liver, or brain. He reports 9 cases in which pure urea was given, in scruple doses 3 or 4 times a day, by mouth or hypodermically, with cures in some cases and improvement in other serious or bad cases that he had thought to be incurable. At the same time he applies treatment in the broad sense, employing such therapeutic measures as are of recognized value.

Burghart ⁵ describes the **treatment of tuberculosis as conducted in von Leyden's clinic**. The fever is treated chiefly by rest, cold bathing, night sweats, by sponging with water which may contain some vinegar, citric or tartaric acid, or a solution of menthol, or formalin and alcohol. They do not use atropin. Obstinate diarrhea is treated by compresses of warm oil and cotton, and by tannalbin and tannigen; some preparation of opium is used if necessary, and particularly if there is tenesmus. Pleuritic pains are often successfully treated by felt

¹ Gaz. degli Ospedali e delle Cliniche, 1900, No. 8.

² Brit. Med. Jour., Sept. 8, 1900.

⁴ Lancet, Mar. 9, 1901.

³ Therap. der Gegenwart, Nov., 1900.

⁵ Berlin. klin. Woch., July 2, 1900.

splints. Injections of salt solution, 1.5% to 2%, have been useful in hemorrhage, while gelatin injections have not. In treatment, among other things, he insists upon the value of large quantities of sugar as a food, as much as 200 drams being used in a day.

A. Hecht ¹ has investigated the value of **Huchard's prescription for hemoptysis**, this consisting of 1½ grains each of ergotin, sulphate of quinin, digitalis powder, and extract of hyoseyamus. He found that its use produced practically constantly a quick cessation of the hemoptysis. In 2 cases prolonged treatment by other methods had been entirely fruitless. He considered that the results were chiefly due to the quinin and digitalis. In severe cases in which there has apparently been a rupture of an artery, he advises the use of subcutaneous gelatin injections.

Frazier's ² treatment for pulmonary hemoptysis rests on the principle of **reducing the intravascular pressure** at the site of the hemorrhage by acting on the heart-beat, and by acting on the vascular approaches to the wounded vessel. He relies mainly upon morphin and ergot respectively to bring about these results. Sufficient rest in bed is also a necessity.

M. Wagner ³ reports upon the use of **subcutaneous gelatin injections** in the treatment of hemoptysis tuberculosis, intestinal hemorrhage in typhoid fever, also in gastric hemorrhages in ulcer, and in cases of hemorrhages accompanying sepsis. The results in the cases of hemoptysis were extremely good, even after other measures had entirely failed; in typhoidal hemorrhages only uncertain effects were observed. Unfavorable collateral effects were not seen and the temperature did not seem to be influenced.

RHEUMATISM.

Etiology.—F. J. Poynton and A. Paine ⁴ report that they have in each of 8 successive cases of acute rheumatism found a **diplococcus** present in pure culture. The organism was found in the blood and in the pericardial fluid and organs removed after death, and in the throat in cases of rheumatic tonsillitis. An interesting fact was that the organisms were grown in an artificial acid medium and also in pericardial fluid from these cases, the latter fluid in the cases in which the organism was found being somewhat acid. After inoculating rabbits the organism was found in exudations in the joints, in the heart's blood, in the urine, and in the cerebrospinal fluid, as well as in the cardiac valves and pericardium. When inoculated intravenously into rabbits, a polyarthritis, bursitis, and tenosynovitis were set up, which sometimes recovered spontaneously. The joint exudation from the rabbits was sometimes clear, sometimes cloudy, and contained considerable numbers of leukocytes. The organism also **produced endocarditis and pericarditis of non-**

¹ Therap. Monatshefte, 1900, No. 10.

² Med. News, Sept. 15, 1900, from Therap. Gaz., Aug., 1900.

³ Mitth. a. d. Grenzgeb. d. Med. u. Chir., Bd. vi, H. 4 u. 5.

⁴ Lancet, Sept. 29, 1900.

suppurative form. The liver and kidney showed coagulative necrosis. There were in some cases pleurisy and pneumonia. The urine became acid, and showed large deposits of urates. The heart-muscle showed degeneration similar to that seen in human rheumatic carditis. The symptoms produced in the animals were painful joint swellings with some fever and wasting, rapidity and irregularity of the heart action, and endocardial and pericardial murmurs and pleural friction. Similar symptoms were produced by passing the organism from animal to animal, the tendency being, however, with further inoculation, to increase the severity of the cardiac lesions, while the arthritis became less pronounced. The cocci were usually found in pairs. In liquid media they grew in chains, in solid media in clumps. They grew both aerobically and anaerobically, but only imperfectly in ordinary media. They seem to be identical with the organisms described by Triboulet and Wassermann. The lesions caused in the valves resembled those seen in man, and the microorganisms were not found on the surface, but in the interior of the valves. In one instance they were found in a rheumatic nodule. In one case of chorea large numbers of the diplococci were found in the perivascular lymph spaces and capillaries of the pia mater, and also in some parts of the motor area of the brain, and in another case of chorea the diplococci were found in the mitral valve. [It may be questioned whether the results of animal experiments are more reliable than injections of organisms found in pleurisy or other inflammations of serous membranes would be. Various microorganisms seem to be capable of causing joint lesions when injected into the circulation, but the identity of such lesions and articular rheumatism is not fully demonstrated.]

F. J. Poynton ¹ discusses the pathology of acute rheumatism, giving a general review of the different ideas concerning its origin, and especially giving a further and extended description of the results obtained by Paine and himself in investigating the bacteriology of the disease. In speaking of the possibility of explaining relapses in rheumatism by bacteriologic study, he states that they found a large solitary coccus which persisted long after the disappearance of the diplococcus, and which, it seems possible, may recover virulence if the resistance of the individual be lowered. The hereditary tendency to the disease is possibly explained by the fact that the diplococcus requires a peculiar culture medium to exhibit its specific characteristics.

F. Meyer ² reports that he had unsatisfactory results from the bacteriologic investigation of cases of acute articular rheumatism when examining the joint exudate directly. Cultures from the tonsils, however, gave interesting results; they almost regularly showed the presence of a diplococcus which grew in chains, and which closely resembled the organism previously described by Wassermann in its general characteristics, but which was not identical with this organism. The diplococcus was found only in persons who had acute rheumatism. Injection into animals produced a seropurulent exudate in the joints,

¹ Practitioner, Jan., 1901.

² Deut. med. Woch., Feb. 7, 1901.

cultures from this exudate usually proving negative. In about one-fifth of the examinations he found a verrucose or ulcerative endocarditis in the animals injected. The number of cases as yet investigated is too small to make definite statements, but Meyer is inclined to believe that the organism is actually the cause of rheumatism, though he by no means feels able to state whether it is the only cause. [The criticism made before in the case of Poynton's and Paine's work may be repeated here, and indeed was made by Singer in the discussion of Meyer's paper. The importance of the lesions found in rabbits was emphasized by von Leyden, but it remains, nevertheless, for the future to determine whether the organisms referred to have a *specific* affinity for the joint structures, if we may so express it, or whether, on the contrary, they are not merely organisms capable of causing widespread inflammations, the joints being included in their sphere of action.]

Menzer¹ is inclined to believe that Meyer's results are scarcely as new as they seem. The most important point in the results he considers to be the fact that these bacteria and those described by Wassermann produce changes in the joints and in the endocardium; but he notes that the discovery of streptococci on the tonsils has been repeatedly reported. Menzer discusses his own results in 4 cases in a similarly critical spirit. Streptococci of diplococcus form were found in the joint exudate in 2 cases, and in 2 others he found similar organisms in the substance of the tonsils. His method of examination was to have a **portion of the tonsil excised, and to make bacteriologic preparations from the cut surface.** He is inclined to believe, from the standpoint of the clinician, that acute rheumatism is a *morbus sui generis*, but he thinks that it is wholly possible that this may not prove to be true because of the close relation which typical rheumatism shows to atypical rheumatoid affections and to pyemia. He thinks it is questionable whether it will be possible to demonstrate constantly, in cases of acute rheumatism, the presence of bacteria which produce joint changes in animals, and he also considers it as yet wholly uncertain whether, when the streptococci are found, they will show such characteristics. It is likewise important to determine whether similar changes are ever produced by microorganisms which are found on the tonsils in normal persons. [Menzer's statements seem to be justifiable from the present aspect of the question. Rheumatism is certainly infectious, but whether the clinical affection which we now call rheumatism is always the result of the same bacterial cause is questionable. There is, however, a good deal of testimony that a diplococcus is frequently active and it may prove to be the usual cause.]

While Porter² shows that there is no scientific basis for the terms "**rheumatic**" and "**gouty**" diatheses, he fully discusses the various theories which explain the chemicopathologic phenomena included under these terms. He characterizes the quadriurate theory as "one grand speculative problem which does not explain the facts as developed by clinical observation." He thinks that neither uric acid nor its urates

¹ Deut. med. Woch., Feb. 14, 1901.

² Boston M. and S. Jour., Oct. 18, 1900.

have yet been clearly demonstrated in the normal blood stream, and inclines to the belief that uric acid is formed by the oxidation of the proteid substances in the protoplasm of the renal cells. "From the great diversity of results obtained, and from the fact that no one form of microorganism is found with any degree of regularity in connection with these so-called 'rheumatic' conditions, the consensus of opinion is that the pathologic conditions and symptoms classed as rheumatic are not to be attributed to the direct and intrinsic bacterial invasion of the structures of the body, as is the case in connection with some of the well-known and undisputed microbial diseases." "The two great predisposing factors in the development of so-called gout and rheumatism are the prolonged intake of a larger amount of nutritive pabulum than the system can perfectly oxidize, or conditions that so reduce the oxygenating capacity of the animal economy that the small amount of food taken cannot be perfectly oxidized. Added to this, as the exciting and determining factors in the production of the special type encountered, are the action of bacteria on the proteid in the alimentary canal and the formation and absorption into the system of toxic products in conjunction with the food products absorbed. The varying changes in the temperature, hygienic surroundings, nervous disturbances, etc., are also important factors." The author proceeds to consider the relationship between this so-called rheumatic diathesis and traumatic joints, septic and gonorrheal joints, acute articular rheumatism, neuropathic joints, and arthritis deformans. He thinks that the "complex chemie sub-oxidation problem, with its associated toxic condition of the system, which has for many years been included under the so-called rheumatic condition, can be looked upon as the direct etiologic factor in producing the lesion and symptoms of so-called acute articular rheumatism in all its varied forms, also the neuropathic joints and some of the forms of arthritis deformans."

A. Newsholme¹ discusses the **epidemiology of rheumatic fever**. After reviewing the Scandinavian records in particular, he decides that there are two kinds of epidemics, one explosive, the other protracted. He adheres to the infective view of the origin of the disease. The relative frequency of the disease in different regions is very difficult to determine because of the different methods of making returns of deaths, but he feels confident that it is an **urban disease rather than rural**. As to the influence of climate, he insists that it is **not favored by dampness**, but that a heavy annual rainfall is usually associated with a low amount of rheumatic fever, and a small rainfall with an excessive amount. He thinks that the disease is essentially a soil disease due to a saprophytic soil organism which is drowned out in wet years, multiplies rapidly in dry years, and is transmitted to the human recipient by unknown means.

Maréchaux² discusses the **relation between trauma of the joints and articular rheumatism**. He considers it probable that rheumatism is frequently the result of a trauma. The trauma does not actually set

¹ Practitioner, Jan., 1901. ² Aertzliche Sachverständigenzeitung, 1900, No. 13.

up the disease, but causes the definite localization of the disease and perhaps makes the joints susceptible to rheumatism when otherwise the patient would escape the disease. This is not improbably the case when the trauma has taken place some time before, and the joints have not fully recovered from the effects, though it is stretching a point to attempt to make any relation between rheumatism and a trauma which is long past. It is notable that in a good many cases of primary attacks or repetition of attacks the disease localizes itself chiefly or wholly in joints which have been damaged by some accident. [That any infections which tend to involve joints are favored by previous injury of the joints is quite definitely demonstrated by both clinical and experimental observations. And in joint diseases, which are certainly not yet known to be infections, and probably are not, such as arthritis deformans, previous trauma of a joint, or excessive strain on the joint, seems in many instances to determine the location in which the disease first appears.]

Bannatyne¹ would divide the **arthropathies** into three great groups: “(1) Bacterial or toxic arthropathies; (*a*) bacterial rheumatism, rheumatoid arthritis, gonorrheal and scarlatinal arthritis (and probably malarial arthritis); (*b*) toxic, gout and pulmonary osteoarthropathy. (2) Nerve degenerative arthropathies such as occur in tabes, ataxic paraplegia, etc. (3) Senile degenerative arthropathies, such as senile arthritis or *malum coxae senilis*.” He would further differentiate between “the essential arthropathies—*i. e.*, those in which the joint troubles form the principal symptom of the disease—and the accidental arthropathies—*i. e.*, those which occur with a certain amount of regularity, but are not essential symptoms of the disease in which they arise.” “Rheumatism, rheumatoid arthritis, gout, senile arthritis, and pulmonary osteoarthritis are called essential arthropathies, whereas gonorrheal, scarlatinal, malarial, and nerve arthropathies are accidental.” The author is a firm believer in the microorganismal theory of the cause of rheumatism and rheumatoid arthritis. He goes fully into the differential diagnosis of the various forms of arthropathies, which, he says, are due to (1) bacteria themselves acting on the joint structures; (2) bacterial poisons (pulmonary osteoarthropathy); (3) toxic poisons of as yet an undetermined character (gout); (4) nerve degenerations; (5) senile degenerations.”

E. Weisz² discusses the **relation between acute and chronic articular rheumatism**, and notes that fever and the anatomic changes which occur in acute rheumatism may also be seen in chronic rheumatism, and that the bony changes sometimes seen after chronic rheumatism are at times present in acute rheumatism. He therefore thinks that there is no real difference between the two diseases.

Treatment.—A. Stengel,³ in discussing the treatment of rheumatism, states that it is probable that this disease is, like pneumonia, due to infection with various organisms which produce similar local results. In treatment he has found the local application of **salicylate of methyl**

¹ *Lancet*, Feb. 23, 1901.

² *Dent. Arch. f. klin. Med.*, Bd. LXVIII, H. 1 n. 2.

³ *Med. News*, Dec. 22, 1900.

valuable both in relieving pain and in controlling the disease. He describes decided improvement in 3 cases of protracted recurring rheumatism from the use of **antistreptococcic serum**, and thinks it possible that in such cases this treatment may prove to be of some use. He recommends the use of plaster casts to maintain complete rest of the joints.

J. C. Wilson ¹ has found the syrup of the **iodid of iron** valuable in infectious arthritis in many cases in which the salicylates were unsatisfactory or useless. In a case described, in which there was polyarticular rheumatism, and in which the salicylates had no beneficial effects, the use of large doses of syrup of iodid of iron soon caused improvement, and the patient finally recovered entirely. Four teaspoonfuls in a day was the largest dose. In another case polyarthritis developed some time after gonorrhea, and iodid of iron soon caused improvement and ultimate recovery.

Grawitz, ² after an extensive use of **aspirin**, in the place of salicylate of soda in acute and chronic rheumatism and neuralgias, places it at the head of antirheumatic remedies. Digestive disturbances, tendency to collapse, and tinnitus aurium do not occur.

CEREBROSPINAL MENINGITIS.

Lorgo ³ contributes a study of the **relation of Diplococcus intracellularis to epidemic cerebrospinal meningitis**. He believes that the earliest description of this microorganism was not that of Weichselbaum, but rather that of Marchiafava and Celli, who in 1884 reported the discovery of such microorganisms in the pus and epithelial cells of the meningeal exudate. He does not state that these observers made any cultures. Lorgo directs especial attention to the fact that lumbar puncture has very clearly demonstrated the etiologic relation of *Diplococcus intracellularis* to cerebrospinal meningitis. He has found no proof of the view of Netter that the diplococcus of Weichselbaum is a form of the diplococcus of Fraenkel. The diplococcus is found within the cells as well as outside, but the course of the disease is not influenced by the situation chosen by the organisms. The fluid obtained by lumbar puncture is more likely to show them situated outside the cells in the earlier periods of the disease, and more frequently within the cells in the later periods. He believes that the microorganism is undoubtedly the specific cause of epidemic cerebrospinal meningitis, and is a definite species. He insists that it is **important to repeat lumbar puncture if the result of the procedure is at first negative**, as not infrequently further trials will give positive results. He also insists that lumbar puncture is very important in prognosis, as it definitely determines whether one has to do with a meningococcus meningitis. The prognosis of the latter is much more unfavorable. Lorgo also states

¹ Med. News, July 21, 1900.

² Gaz. Hebdom. de Méd. et de Chir., July 15, 1900, from Klin. therap. Woch., 1900, No. 19.

³ Policlinico, Man., 1901.

that he believes that the recrudescences often observed in the course of cerebrospinal meningitis are due less to the direct influence of bacteria upon the tissues of the central nervous system than to intestinal intoxication resulting from dietetic indiscretions. Such factors are especially active at this period, in his opinion, because of the abnormal irritability of the central nervous organs. He believes the correctness of this view is shown by the disappearance of many of these recrudescences after disinfection of the intestinal canal with calomel.

PLAGUE.

W. C. Hossack, ¹ in discussing the **diagnosis of plague**, mentions **six varieties**: The bubonic, the pneumonic, the septic, the intestinal, the meningial, and the carbuncular. Among the interesting cases which he mentions are a number in which the intelligence of the patients remained uninfluenced until a few minutes before death. Of 193 cases which he mentions, 149 were bubonic. Concerning the pneumonic type he draws attention to the fact that respiration is frequently not altered, and that the physical signs are usually those of consolidation of the apices. The intestinal type often resembles cholera closely, but the fever is likely to be high and the evacuations often contain blood. In the meningial type, while during life signs of meningitis are observed, autopsy usually discloses no inflammation of the meninges. The carbuncular type is very rare; it produces carbuncles with a marginal but not very severe induration, in which marked excavation does not occur.

E. S. Pillsbury, ² in reviewing the clinical and postmortem conditions in the **11 cases which occurred in San Francisco** and were considered to be plague, decides that all the cases were atypical, that each was sporadic, and all occurred in a city free from the disease and in which no infected ships had been known to have arrived. Since also each case had a different clinical history from any ordinary course of plague, and the pathologic conditions were not those usually found in plague, he considers that the cases were **probably not plague**, and that the bacteriologic examination reported cannot be trusted, since the chief testimony that the organism found was the plague bacillus was that it caused death when inoculated into guinea-pigs. He believes that the other characteristics of the organism were not those of the plague bacillus.

A. Lustig and G. Galcotti ³ discuss the results from **inoculations of the nucleoproteid isolated from plague bacilli** in the treatment of bubonic plague. They note that they have been able to produce some immunity in animals by the use of this substance, and probably some antitoxin was likewise produced. They consider the nucleoproteid the substance which causes active immunity; it causes this through producing a specific bactericidal power in the injected subject. They noted a

¹ Lancet, Nov. 24, 1900.

² Phila. Med. Jour., July 21, 1900.

³ Brit. Med. Jour., Jan. 26, 1901.

good deal of difference in the action of serum obtained from different horses. They refer to the general results from the use of this serum as giving a mortality of about 53% at a period when the general mortality was about 94%; more recent results published by Polverini show a mortality of 39% and 36%, while another recent series of 1190 cases in which the serum was used showed a mortality of only 19.57%.

C. Terni and I. Bandi¹ have prepared a lymph for inoculation against plague by injecting guinea-pigs in the peritoneal cavity with a bouillon culture of plague bacilli. The animals died within about 48 hours. The exudate from the peritoneal cavity is best secured just at the time of the animal's death. It is diluted with sodium chlorid solution, then placed in the thermostat and kept at about 37° C. for a day or a day and a half to give opportunity for development of the bacilli, and to show that there is no mixed infection. It is then sterilized for 2 days for about 2 hours each day at 50° to 52° C. If necessary, it is diluted with a mixture of 0.5% carbolic acid, 0.25% sodium carbonate, and 0.75% sodium chlorid. This serum was used as a means of protection in experimentally infected animals, and was found to be quite as useful as Haffkine's lymph, and did not cause the unpleasant collateral effects seen with the latter. The dose could also be accurately measured.

J. Bell² describes a severe case of pneumonic plague which occurred in a man of 24, and in which the temperature rose to as high as 106.4°. Besides digitalis and strychnin, carbolic acid was given in 12-grain doses every 3 hours. The temperature reached normal on the fourth day of treatment, and the man soon recovered entirely. **Two hundred and eighty grains of pure carbolic acid was taken in all**, and Bell believes that it saved the man's life.

CHOLERA.

Neve,³ in a brief account of the epidemic of cholera in Kashmir, in 1900, states that the mortality was 56%. He insists that it is extremely **important to use sulphuric acid as a prophylactic**, and that the early treatment of the disease should include the use of opium. He states that 70% of those treated by opium recovered.

P. Krause,⁴ in reporting a case of **poisoning by corrosive sublimate**, notes the fact that a skin eruption appeared about 10 days after the poison was taken, which was of a punctiform character, of a general bright scarlet color, and closely resembled the eruption often seen in cholera. Since in the recent **Hamburg cholera epidemic an eruption was frequently noted**, and since the disease was **frequently treated with calomel**, he is inclined to think that a good many cholera eruptions are really not due to cholera, but to mercury. The case reported was a very remarkable one, because while von Jaksch gives the fatal dose of corrosive sublimate as 0.2 gram, this man took

¹ Deut. med. Woch., July 19, 1900.

³ Brit. Med. Jour., Dec. 15, 1900.

² Lancet, July 7, 1900.

⁴ Deut. med. Woch., Feb. 21, 1901.

with suicidal intent 2 grams in solution. He had all the symptoms of severe bichlorid poisoning, including violent stomatitis with purulent keratitis, severe gastritis with bloody vomiting, severe enteritis and colitis with mucous and bloody stools, and severe nephritis with marked prostration; but he recovered what was apparently almost entire health within 2 months, probably because almost immediately after taking the poison severe vomiting came on, and he was also quickly treated by energetic gastric lavage.

ERYSIPELAS.

A. W. Harrison¹ describes a case of facial erysipelas of unusual severity. The temperature had reached 105°, and the patient was thought to be moribund. He injected 20 cc. of **antistreptococcic serum**, and the patient began to improve at once. Injections of 10 cc. were repeated twice daily at first, subsequently once a day. After a few days the patient made a rapid and complete recovery.

LEPROSY.

Sabrazès and Mathes² state that in the examination of 2 cases of nodular leprosy they found a decided **eosinophilia**. The change in the blood, however, is not constant, as exactly the opposite condition was found in a third case. The total numbers of red and white cells, the amount of hemoglobin, and, in general, the relative numbers of the other leucocytes were wholly normal.

W. Dönitz³ reports some results from the use of **chaulmugra oil** in the treatment of leprosy, particularly referring to subcutaneous injections. The results of such injections are local and general reaction. The local reaction consists in irritation at the point of injection and in a pericyclitic congestion of the eyes. The general reaction consists chiefly in a rise of temperature. He considers that if the substance is used subcutaneously injections should be repeated only after the ocular disturbance has disappeared. He reports one case in which the infiltrations disappeared four months after the use of injections. Sulphur baths also had been given in this case. In another case the use of injections alone caused a marked reduction in the size of the nodules, and a very marked improvement in a pannus which had caused practical blindness in one eye. He recommends that the injections be given at intervals of 10 days to 2 weeks, 1½ to 3 grains being administered at a dose. The temperature should not rise more than about 1° after the injection. It is probable that chaulmugra has some influence on other diseases than leprosy, particularly on syphilis and tuberculosis.

M. H. de Brunn⁴ has used **ichthyol** in the treatment of leprosy with good effect. He administers 1 gram of ichthyol with directions to continue the treatment indefinitely. The local use of ichthyol has not seemed to be of any value.

¹ Brit. Med. Jour., July 7, 1900.

² Gaz. Hebdom. de Méd. et de Chir., 1901, No. 2.

³ Berlin. klin. Woch., Sept. 3, 1900. ⁴ Bull. de l'Acad. de Méd., Apr. 23, 1901.

MALTA FEVER.

W. E. Musgrave¹ reports in detail a case of Malta fever which occurred in Manila. The patient was a soldier of 21, who had been in Manila for a year when taken sick. He was admitted to hospital after a 2 months' course of fever. He had pain in the joints and in the face, severe night sweats and irregular fever, the febrile course lasting 27 days after his admission to hospital and varying in intensity, the record sometimes showing as much as 105° ; there were, however, no very distinct undulations. The conditions discovered upon autopsy were not noteworthy, but bacteriologic examination showed the presence of an organism which corresponded in its characteristics to *Micrococcus melitensis*, and agglutinated with the blood-serum of a monkey infected with the latter organism. Musgrave gives a review of the cases of laboratory infection with this organism, and a brief discussion of the regions in which it has been found. He states that a second case was discovered in Manila, and that recently other cases have been seen which gave a marked reaction with *Micrococcus melitensis* in high dilution. One of these cases had been diagnosed malaria, though parasites were not present; the other 2 had been called typhoid fever. In the 2 latter cases, however, the Widal reaction had not been present, and malarial parasites were absent.

PNEUMOCOCCIC INFECTION.

E. J. Cave² reports a case of pneumococcic arthritis in a man of 51. He was seen after 11 days of illness, and had shown a pneumonia of the right base followed by the same condition of the left base, and was moribund when seen by Cave. It was noticed, however, that his left shoulder was red, swollen, and edematous, and it was learned that this shoulder had been injured 5 days before in struggling in his delirium. Death occurred shortly after he was first seen. The shoulder joint was aspirated; a thick creamy pus was obtained and pneumococci were found in the exudate. Thirty-one other cases of pneumococcic arthritis were collected from the literature. Of the total 31 cases, 23 were fatal. In 23 cases there was immediate association with pneumonia. In 2 of the cases the arthritis preceded the pneumonia. It occurred more commonly in males, and chiefly in adult life or in those of advanced age, and was more common in the upper extremity. Suppuration occurred in 27 instances, perhaps in 28. The pneumococcus was shown to be present in 30 of the cases, and a general infection was shown in a considerable number of cases; there was malignant endocarditis in 6, meningitis in the same number, pleurisy and empyema in 5, pericarditis in 2, nephritis in 3, and peritonitis in 1. The pneumococcus was found in the fluid of the joints and in the surface tissues, but not in the deep tissues. The condition is of decidedly unfavorable prognosis. If death does not occur, the joint is often permanently

¹ Phila. Med. Jour., Nov. 24, 1900.

² Lancet, Jan. 12, 1901.

damaged. The general symptoms are usually severe, while the local symptoms vary in intensity. If suppuration is determined to be present, surgical treatment is essential, while if aspiration shows only serous or serofibrinous exudate, rest and compression should be used. It was noted in a number of cases that there had been **previous injury or disease of the joint involved**, a fact which is compared with the experience of experimenters, that previous damage of a joint is often followed by involvement of this joint when pneumococci are injected subcutaneously. The direct injection of pneumococci into the joints of susceptible animals usually produces a suppurative arthritis, and intravenous injection is not infrequently followed by arthritis; and in partially immunized animals who escape septicemia arthritis not uncommonly occurs after injection of virulent pneumococci.

VACCINIA.

Czaplewski,¹ who had previously described *Staphylococcus quadrigeminus* as a constant discovery in the vaccinia pustules of calves, discusses the results reported by Nakanishi. The latter author criticized the results of Czaplewski and stated that he had found a new bacillus constantly present in the vaccinia pustules. Czaplewski states that he at no time claimed positively that *Staphylococcus quadrigeminus* was the cause of vaccinia even though he found this staphylococcus constantly present, and although it apparently produced typical vaccinia from the lesions of which vaccinia could be produced in other animals and in children, he decided that this transmission was due merely to some form of infection in the stable, the chief reason for this being that he found afterward that ***Staphylococcus quadrigeminus* was a constant skin saprophyte in normal calves.** He insists, however, that *Staphylococcus quadrigeminus* is a new variety of organism not previously described, differing from *Staphylococcus aureus* and *albus*. As to the bacillus described by Nakanishi, he states that this has been previously recognized by a number of observers, and is generally considered to be a variety of pseudodiphtheria bacillus. The article closes with a note that Nakanishi himself has recently admitted that the bacillus which he describes has no etiologic relation to vaccinia. [See also Funck's article under Variola.]

L. Stumpf² reports statistics concerning vaccination in Bavaria in 1899. **About 200,000 vaccinations were necessary**, and of these about 170,000 were carried out, chiefly with glycerinated vaccine. About 128,000 were listed as requiring revaccination, and in 125,000 this was carried out, with good results in most instances. Four hundred thousand portions of vaccine were furnished by 63 calves. He found a difference in the potency of the vaccine coming from different sources. Careful asepsis was always observed in performing vaccination. He recommends a lancet of platinum-iridium, which can be thoroughly sterilized, and that **4 areas be inoculated.** More certain results are ob-

¹ Dent. med. Woch., Nov. 8, 1900. ² Münch. med. Woch., Dec. 11 and 18, 1900.

tained by the last-mentioned procedure. By the use of this method failures to produce vaccinia were hardly ever observed. For instance, in one series of 6154 vaccinations there were but 15 failures. It was often observed that several pustules developed from one area of inoculation. It was also noticed that poorly nourished children and young children showed poorer pustules than older and well-developed children. Postponement of the occurrence of the vesicle, or its early appearance were both observed in a number of instances. **Varicella was often observed coincidentally with vaccinia.** Several cases of general eruption were reported, but they caused no disturbance of the general health and soon disappeared. A general vaccinia was observed in one instance. The report showed one case of autoinoculation of the eyelid which caused little trouble, another case of autoinoculation of both eyelids which caused enormous swelling and closure of the eyes, but the swelling disappeared and the eyes were left undamaged. There were a number of cases of severe local reaction, some cases of mild erysipelas, and other similar results reported. They could in all cases, however, be traced to a lack of cleanliness either in the vaccination or subsequently in the care of the sores. [It is undoubtedly preferable, in private practice particularly, to vaccinate repeatedly if necessary rather than to inoculate in several places at the same time. The latter method causes useless discomfort, and is only advisable when it is essential to secure a positive result at once if possible.]

Cronigneau ¹ discusses the **safety of revaccination.** Among 80 patients in whom he has practised revaccination, there was a normal temperature in all but 16; and of these 16, 12 suffered with diseases which in themselves would have produced temperature. The 4 exceptional cases were as follows: apyretic bronchitis, phlegmasia alba dolens, cancer of the stomach without fever, apyretic rheumatism. He has never had any bad results. Accidents in the present state of knowledge regarding the preparation and use of vaccine must be considered the result of contaminations. Referring to the matter of **vaccination in infectious diseases**, such as erysipelas, scarlatina, and measles, he quotes from private communications of Dr. Siredey and Dr. Beclere, who have had charge of the pavilions for erysipelas, that they have found no bad results from vaccination. The same is true of scarlatina and measles, and he further refers to the publications of Jasiewicz, which would indicate an actual antagonistic effect of vaccination in these infections. [An interesting contrary effect is also observed at times; *e. g.*, there is good evidence that the existence of another infection at the time of vaccination, or the onset of such an infection directly after vaccination, may prevent or postpone the development of vaccinia.]

J. Sobel ² contributes a paper on **vaccination eruptions**, and describes a number of cases which illustrate various types of erythematous, urticarial, papular and vesicular, pustular, bullous and multiform, and measles-like and scarlatina-like eruptions. Some eruption was observed

¹ Jour. de Méd. de Paris, Jan. 20, 1901.

² Med. News, Aug. 11, 1900.

in 80 children out of a total of 583. In several cases autoinoculation occurred, and in one instance a mother was inoculated from her child. The diagnosis between the morbilliform type of eruption and measles was very difficult, and was chiefly made by the absence of Koplik's spots, the suddenness of the onset, and the absence of desquamation. In some cases the diagnosis from German measles could not be made. In 67 cases deep ulceration was observed as a sequel of vaccination.

J. J. Harding¹ reports a case in which **impetigo followed vaccination**. The infection was evidently from the chafing of dirty clothing. *Staphylococcus aureus* was found present.

J. D. Staple² reports the case of a girl of 15 whose right hand was covered with warts. She was revaccinated with success, but without any influence upon the warts until **7 weeks after vaccination**, when **the warts began to disappear**, and finally vanished entirely within 3 months, leaving temporarily white spots in some places. Ultimately nothing remained to indicate that the warts had ever been present.

VARIOLA.

Etiology.—M. Funck³ states very positively that he has demonstrated the **cause of vaccinia and variola**, and that in both affections the cause is the same, the active agent merely showing a higher degree of virulence when variola results and lessened virulence when vaccinia occurs. He states that both are due to protozoan infection. He found protozoa in practically all vaccinia pustules examined and in the surrounding tissues. They are probably the same organisms previously described by Pfeiffer and others, but he gives some additional points concerning their structure and the methods of demonstrating them, and particularly insists upon his observation that while these organisms are usually from 1 to 3 μ in diameter, one often finds cyst-like bodies which are as much as 25 μ in diameter, and are filled with spores. A culture, in a bacteriologic sense, cannot be made with these protozoa, but he found that if he smeared the surface of an agar plate with a few drops of so-called sterile lymph, which contains only a few of the protozoa, and placed the plates for 24 hours in a thermostat, he was readily able by examination of the plate with the microscope to find these spores, pick them out with a platinum needle, and inject them. **The result of such injections was the production of a typical vaccinia** which immunized animals against further inoculation with ordinary vaccinia. The protozoa were found in practically all pustules of vaccinia and in the surrounding tissue. He considers that this demonstrates definitely that the protozoa actually cause vaccinia; and since he observed entirely similar objects in variola, he considers that the two diseases are due to the same cause, and that the difference in intensity is due merely to a difference in virulence.

Symptomatology.—H. M. Bracken,⁴ in discussing the **peculiar**

¹ Lancet, Nov. 3, 1900.

² Lancet, Sept. 22, 1900.

³ Deut. med. Woch., Feb. 23, 1901.

⁴ Jour. Am. Med. Assoc., Sept. 8, 1900.

mild form of smallpox which has appeared during the past year in some parts of this country, considers the question as to whether it should be called pseudo-smallpox, or should be believed to be merely an irregular smallpox, but still the unmodified disease. The mere variation in certain symptoms does not convince him that the disease is not smallpox, and he thinks that it is a dangerous plan to allow the belief that the disease is not actual smallpox to lead to carelessness in the suppression of the disease. He states that over a thousand cases of smallpox of this peculiar modified character have been seen in Minnesota since January, 1899, one of the most striking facts about the disease being that the **total mortality was only a little over 2%**; indeed, in some localities no cases were fatal, although many occurred. [The general opinion of the profession is in agreement with Bracken's belief that the cases were real smallpox and that precautions should be taken in accordance with this view. A contrary opinion is expressed by Happel, which follows.]

Happel¹ discusses a series of about 300 cases of a curious affection which he saw in Gibson County, Tennessee. The **disease bore a similarity to smallpox**. There was in many cases the same onset, with headache, backache, and fever, and there was a papular eruption followed by a vesicular eruption; the contents of the vesicles later became opaque, but usually had none of the appearances of an actual pus. The vesicles were flattened, but not umbilicated, and when filled with fluid were conoidal, not hemispheric. There was in no case an ulcerated surface left after the removal of the crust, and the vesicles always desiccated and did not separate, thin scales being formed instead of crusts. There was no secondary fever, no inflamed margin around the pustules, and the patient practically always got out of bed at the time of the appearance of the eruption, since the symptoms were so slight, the fever subsiding with the appearance of the eruption. Nausea and vomiting were very rare, as was itching; pitting was likewise rare. There were usually maculas left in the areas occupied by the eruption. Vaccination did not seem to exert any protective influence against the disease so far as could be determined. Happel thinks that he did definitely show that **those who had recently had the disease could be successfully vaccinated**. He believes that the disease cannot be called true variola. There was no mortality. **In the discussion there was a general expression of the opinion that the disease was smallpox**. Happel, however, read a series of letters from practitioners in Southern States who described in some instances large series of similar cases which were of such mild course that all were inclined to believe that the disease was not smallpox. [There is no question that a mild form of smallpox has been causing a considerable morbidity in various regions of this country during the past 2 or 3 years. There is good reason for the belief that Happel's cases were irregular smallpox, and it is extremely unwise to omit any precautions against the spread of the disease.]

S. C. Barrow² reports a series of 100 cases of smallpox seen at the

¹ Jour. Am. Med. Assoc., Sept. 8, 1900. ² New Orl. M. and S. Jour., Sept., 1900.

Shreveport pest-house in January and February, 1900. The **incubation period seemed to be regularly between 10 and 15 days**. He notes particularly that only 23 of the cases showed a distinct chill, and only 11 showed nausea and vomiting. The latter symptoms he considers to be indicative of a severe attack when they occur. He observed pharyngitis in 90 % of cases. He considers that it is **impossible to differentiate smallpox from remittent malarial fever previous to the appearance of the eruption unless blood-examination is undertaken**. In the treatment he used cocaine and fluid extract of ergot for the purpose of contracting the arteries.

Kaufmann¹ discusses the **epidemic of smallpox which occurred in Frankfort** in the summer of 1900. The source of infection was very carefully searched for, and it was found that, except in one case, there was distinct evidence of direct contact with other cases. In the remaining case it was probable that infection had occurred from some case that had not shown a typical eruption. Twenty-six cases occurred in all. Kaufmann particularly directs attention to the **relation of the severity of the cases to vaccination**. One patient had been vaccinated within 6 years, but unsuccessfully; his illness was very slight. Five who had been vaccinated within 20 years had very mild attacks. Thirteen had been vaccinated within 20 to 50 years, and 5 of these had very mild attacks, 5 severe attacks, and 3 very severe attacks. Five had not been vaccinated within 50 years; 3 of these had moderately severe attacks, and 2 had severe attacks. It was evident that the influence of vaccination was gradually lost. Seven persons were vaccinated during the attack, 2 of these for the first time; the vaccination was successful in 4 instances. In 2 cases he observed eruption while the initial fever was high. One patient was brought into the hospital comatose. Four deaths occurred; three patients died in the course of the primary infection, and the fourth case ended fatally during the suppurative stage. Two physicians attended the patients, and at the same time went about their usual duties. They did not communicate the disease, apparently because they were extremely careful always to bathe and to make a complete change of clothing after their visits to the variola cases.

O. Lerch,² after describing a case of what appeared to be **concomitant measles and chickenpox**, reports a further case which occurred in a man of 28 who had been freely exposed to measles, and who had the usual catarrhal symptoms of the onset of measles on February 20th to 23d, when he had a typical measles eruption, the temperature falling on the 27th. On the 28th the characteristic eruption of smallpox was observed. Lerch thinks that this was undoubtedly a case of **measles followed by varioloid**. He also mentions another instance in which one member of a household developed varioloid; shortly afterward a child in the house showed measles, and a little later the same child had characteristic chickenpox. He thinks that smallpox has a tendency to spread and become malignant when an epidemic of measles prevails, and that conditions favoring the growth of one of these diseases favors

¹ Münch. med. Woch., Dec. 11, 1900.

² New Orl. M. and S. Jour., Aug., 1900.

the growth and spread of the other. He also considers that when the rash of measles precedes that of smallpox, when both diseases are epidemic and smallpox is spreading and is malignant, the occurrence of the rash of measles is a symptom of measles complicating smallpox, and that this combination causes the malignancy and spread of smallpox. [In view of the well-known occurrence of initial rashes in smallpox, it is difficult to believe that these were not cases of smallpox without complication with other diseases, but with well-marked initial eruptions.]

Hervieux¹ reports an **outbreak of horsepox** which occurred under the observation of Dr. Moreau. The first case observed was in a farmer, who presented himself with eruption, on the dorsal side of his hands and fingers, of large vesicles somewhat flattened and umbilicated. The vesicles were whitish, transparent, and surrounded by a red areola. He had not been in any contact with any children and there had been no chickenpox in the vicinity. It was then discovered that a mare had a similar eruption. An inquiry in the neighboring village discovered other persons who had had similar eruptions. The epidemic, it was found, had begun in 1898 at another place and had been transported to Lusignan. **It had affected 170 of 200 mares, and 22 persons.** There was no mortality. The eruption usually began on the fourth day and reached its full development by the eighth or tenth day.

RABIES.

Marx² has found that **fixed virus is harmless when given to monkeys by intramuscular injection.** When it is introduced into the anterior chamber of the eye, it causes infection, but not typical hydrophobia. Since Marx has found that for two different varieties of monkeys the passage of the hydrophobia virus through rabbits causes a reduction in virulence, he reaches the conclusion that **fixed virus may also become in man a modified hydrophobia virus.** It is very readily possible to come to this conclusion, since this would explain the harmlessness of inoculation against hydrophobia. Although the virus by passage through rabbits loses some of its virulence, it does not lose its power of immunizing.

WEIL'S DISEASE.

A. Schittenhelm³ describes a case of **Weil's disease** in a man of 31. The symptoms were an onset with headache, fever, sore throat, and gastric disturbance, and general prostration, with delirium, followed by jaundice, enlargement of the liver and spleen, muscular pains, and signs of nephritis. The man recovered, the fever disappearing by lysis; the convalescence was slow, however. The pulse during convalescence was rapid. The origin of the disease could not be determined. Bacteriologic examination of the blood was negative.

¹ Bull. de l'Acad. de Méd., May 21, 1901. ² Deut. med. Woch., July 19, 1900.

³ Münch. med. Woch., July 10, 1900.

BERI-BERI.

C. Bullmore¹ considers that the so-called beri-beri seen in England is not the same disease that is met with in foreign countries, and he thinks that it is neither infectious nor contagious. He believes that it is due to poison produced by disturbed digestion in sailors who have been improperly dieted, and considers that by **insisting upon the proper dieting** of sailors, and the use of iron and digitalis, the disease could be practically stamped out on shipboard. He refers to the successful results that have been attained in the Japanese navy, particularly through the use of proper diet.

GLANDULAR FEVER.

L. Durno² reports a series of cases of glandular fever which appeared in epidemic succession and involved with one exception children from $2\frac{1}{2}$ to 13 years of age, one adult, a mother who had nursed three children through their illness, showing the affection. If the disease appeared in a household, practically all the younger members showed the disease. He describes the characteristics of the epidemic, which were those usually seen. The glands first involved were in most instances those on the left side of the neck. He found in most cases increased size of the liver, and tenderness over the spleen; dysphagia was present in all cases; slight deafness also was common. He notes, however, that **the urine**, excepting for a high color, **was apparently normal in all but 2 cases**. Most of the patients showed decided acute anemia. Death did not occur in any instance.

Mayer³ reports the case of a girl of 20 who had an attack lasting about 8 weeks, in which there was fever, albuminuria, enlargement of the lymphatic glands, particularly in the neck, an increase in the size of the spleen and to some extent of the liver. Examination of the blood was negative, and no other diagnosis being apparently acceptable, Mayer considered the case one of **glandular fever in an adult**. It was noted that the **eosinophiles** in this case were "**trebled in number**"; they were also larger than usual and the granulations were coarser.

INFECTIONS OF OBSCURE ORIGIN.

B. L. Wright⁴ discusses what he terms "**Cavite fever**," an affection which is, he states, met with almost exclusively in the Cavite naval station and in the immediate surroundings. Almost all persons who arrive at the station soon contract the disease, and if they leave the station after having had the disease and again return to that place, they are very likely to have another attack. He mentions an epidemic which occurred on board the United States steamship "Manila" on her way to Borneo after having touched at Cavite. The disease is characterized

¹ Lancet, Sept. 22, 1900.

³ Med. Rec., Aug. 11, 1900.

² Brit. Med. Jour., Nov. 10, 1900.

⁴ Phila. Med. Jour., Feb. 9, 1901.

by an abrupt onset, high fever, severe muscular pain, and very tender and painful eyeballs. Patients often become delirious, and are frequently much prostrated. The stomach is usually upset. The fever continues for from 3 to 5 days and falls by crisis. The muscular pains may be continued beyond this period. Relapse is uncommon, but two, three, or even more separate attacks are frequently seen. The disease resembles dengue, but the absence of an afebrile period followed by a second febrile attack, and the absence of a rash, separate it from this disease. There are no catarrhal symptoms, and this separates it from influenza. The treatment is chiefly symptomatic. The incubation period varies from 2 days to 2 weeks. The disease is apparently predisposed to by high temperature, dampness, and overcrowding. Wright believes that the muscular pains are due to toxic peripheral neuritis. He has seen several cases of foot-drop with muscular atrophy which probably resulted from this affection, and 1 case of atrophy of the scapular muscles, with dislocation of the scapula and dropping of the shoulder.

F. W. Foxworthy¹ discusses **calentura**, and he has seen it in the Philippines. He states that the term is freely used for almost any febrile disease, but that as he uses it it is limited to the fever which occurs commonly during December, January, and February, and **runs the course of a simple continued fever with a small mortality**. There is sudden rise of temperature, with which there may be a chill, but there usually is not. There are general symptoms associated with the fever; frequently vomiting, with general pains, the latter symptom being the more distressing. The pain is chiefly situated in the back. The fevers seemed to occur in those who were insufficiently covered at night, exposure to the night air and the next day to the heat of the sun being almost inevitably followed by the onset of fever. Mosquitos apparently had absolutely no relation to the disease. The affection occurs in distinct epidemics and is usually an accompaniment of the onset of a cold wind. The differential diagnosis from dengue is difficult, but the terminal fever, eruption, and desquamation are not seen. It is not malaria, as the plasmodium is absent, and in most cases there is no chill. Smallpox is difficult to exclude. A case is reported which three surgeons, including Foxworthy, at first considered calentura, but which Foxworthy 2 days later at once recognized as a case of mild smallpox. The treatment is chiefly symptomatic; quinin seemed to do no good. The best medication seems to be a dose of 15 or 20 grains of phenacetin or antipyrin, with liquid diet.

METABOLIC DISEASES.

GLYCOSURIA.

Some recent investigations regarding the occurrence of sugar or of nonfermentable carbohydrates in the urine are most interesting and seem to foreshadow further results. It would seem from certain experiments

¹ Phila. Med. Jour., Oct. 13, 1900.

that there is probably in diabetes a disorder of carbohydrate metabolism of greater extent than has generally been thought, and that glycosuria is but one of the manifestations.

H. Rosin and F. Alfthan ¹ report upon the investigations of Alfthan concerning the **unfermentable carbohydrates in the urine** of normal persons and diabetics. It was found that the normal amount varied from 1.5 to 5 grams per day of benzolesters when using the method of Baumann. These benzolesters, however, included the normal amount of glucose, hence the figures are a little high for unfermentable carbohydrates. In diabetic urine, on the contrary, the amount of benzolesters varied from 9 grams to over 20, the amount standing in no direct relation to the amount of sugar excreted. These results are suggestive, and they indicate that possibly some increase in the unfermentable carbohydrates may be found in diabetics at the periods when fermentable carbohydrates disappear from the urine under careful diet. It was found in one case of diabetes insipidus that the unfermentable carbohydrates were probably largely increased, a point which may prove of interest in the discussion of the relation between diabetes mellitus and insipidus. Rosin considers that it may be of interest to carry on investigations of the unfermentable carbohydrates in the blood-serum in diabetes, and the relation of the amount of unfermentable carbohydrates in the normal urine to character of the diet. A reaction which Alfthan considered characteristic for a substance in the urine which was precipitated by alcohol was that it gave a slight Trommer's reaction and not the Nylander. Further investigation showed that a mixture of animal gum and grape sugar, if the former were in excess, gave the copper reactions, but not Nylander's. This reaction, therefore, seemed characteristic of a mixture of animal gum and sugar. The result of their work was considered to be an indication that diabetes mellitus is not a mere glycosuria, but is an excretion of carbohydrates in general. In other words, that the disease is not a grape-sugar disease, but a general carbohydrate disease.

H. Sachs ² refers to his previous work, which has shown that the **extirpation of the liver** caused a reduction of the tolerance of levulose, but not of other sugars. He investigated the possibility of the production of glycogen elsewhere than in the liver, through the administration of levulose, and found that after extirpation of the liver the use of levulose did not seem to increase the muscle glycogen. He therefore concludes that levulose will not increase the muscle glycogen and that the production of glycogen in the muscles is under different influences from the same processes in the liver, for both the muscles and the liver can produce glycogen from dextrose, while apparently only the liver can produce glycogen from levulose.

Robin ³ says that either a simple glycosuria or dyspeptic diabetes may result from the **effect of dyspepsia upon the liver**. Simple glycosuria is irregular, of small amount, and found in about 5% of those

¹ Deut. med. Woch., Aug. 2, 1900.

² Zeit. f. klin. Med., Bd. XLII, H. 5 u. 6.

³ Gaz. Hebdom. de Méd. et de Chir., Feb. 10, 1901.

cases of hypersthenic dyspepsia, with exaggerated appetite, dilated stomach, hypertrophied liver, and hyperchlorhydria. Diabetes consequent upon dyspepsia is amenable to treatment, though the overactivity of the liver, at first intermittent, may become permanent, and so give rise to a true diabetes.

Reale ¹ recommends the following **method for the demonstration of a physiologic glycosuria**: 65 cc. or 130 cc. of urine is first freed from albumin and then placed in a porcelain dish, 8.15 grams of neutral lead acetate added, well digested, filtered, 50 cc. or 100 cc. of the filtrate taken and 5 to 10 grams of ammonia added, and the mixture shaken; after a few minutes' shaking the precipitate is collected, dissolved in a porcelain dish with about 25% sodium hydrate solution, and the ordinary tests for sugar are used upon this solution.

Biedl and Kolisch, ² after experimentation by administration of phloridzin to dogs and rabbits, are opposed to the **elimination theory of phloridzin diabetes**, and explain the glycosuria by a flooding of the blood with sugar. It is probable that the liver and the kidneys are the source of the sugar. Kolisch, after his investigations concerning the jecorin of the blood, believes that sugar, when it occurs preformed in the blood, must under all circumstances be excreted, but that normally the sugar occurs in combination.

E. Adler ³ describes the case of a girl of 20 who **took 10 cc. of a 5% solution of morphin**. The urine, on the day after the poisoning, showed 0.7% of glucose, and on the following day traces. Pentoses were not present. On the third day the patient was practically well, and was discharged.

DIABETES MELLITUS.

Pathology.—The actual pathology of diabetes is almost as mysterious as ever. A good deal has been learned regarding the formation of glycogen and the combinations of carbohydrates and proteids, but the precise seat of the metabolic disturbances of diabetes remains obscure. Some authors believe that a failure of glycolytic action on the part of the blood is an essential condition, but the uncertainty of much of their work may be judged of by the studies of Biernacki.⁴ He investigated **glycolysis in pathologic conditions**, particularly diabetes and functional neuroses. He first discusses the methods of determining the presence of glycolytic ferment in the blood and the degree of its action. He particularly insists upon the importance of his discovery that there is a marked relative, as well as absolute, difference in the action of different amounts of blood upon different quantities or different strengths of sugar solutions. If the sugar solution is increased in strength, there is a marked relative and absolute increase in the glycolysis, while an increase in the amount of blood often caused no increase in the glycolysis, and sometimes even caused a decrease. Glycolysis

¹ La Riforma Med., 1900, No. 239.

² Wien. med. Woch., Nov. 10, 1900.

³ Prag. med. Woch., 1900, No. 28.

⁴ Zeit. f. klin. Med., Bd. XLII, H. 5 u. 6.

was much more active in an alkaline mixture than in a mere physiologic salt solution. It is therefore essential that in obtaining results for comparison one must always work with the same amount of sugar solution of a fixed strength, and with the same amount of blood. One observation of interest was that blood which had not been defibrinated acted much better than defibrinated blood, and with the increase of the amount of water in the blood there was apparently an increase in the glycolysis. He insists, however, that the results obtained in different conditions of health are of only relative value. There is an optimum condition of alkalinity of the blood and of concentration of the sugar, which when attained shows the most marked activity of that specimen of blood, and this varies largely for different cases. In order to get absolutely satisfactory results, this optimum should be determined for every case, which is manifestly almost impossible. A comparison of results is of marked interest then only when some of the results show a very decided difference from the normal. In a series of diabetic cases he found the oxidation of sugar to be distinctly reduced below the normal, but he also observed that if the concentration of the sugar solution were increased, there was an abnormally marked increase in the oxidation of the sugar. He therefore considers that one cannot speak as yet, with any certainty at any rate, of a reduction of the glycolytic power of the blood of diabetics. It can only be said that it shows variations from the normal. He was especially interested in the conditions in functional neuroses, particularly hysteria and neurasthenia, and examined a series of cases. He draws attention to the fact that in these conditions the venous blood, as in diabetes, is likely to be of unusually bright color. He found also that the functional neuroses usually showed decided decrease of the glycolytic power of the blood, though this varied. The conclusion reached as to this point was that the oxidative power of the blood in functional neuroses was extremely variable. The most characteristic thing concerning the blood was that it acted as defibrinated blood. It oxidized better after defibrination than before, directly the contrary to normal blood. As to whether this was the cause or the result of the disease he was unable to state. He directs attention, however, to the fact that there is considerable similarity between the blood of diabetes and that of functional neuroses, and that the two conditions have close clinical relations.

P. F. Richter ¹ reviews his previous work on the **influence of the kidneys upon the retention and excretion of the blood sugar**, and also critically discusses the literature upon this question. Richter had previously shown that after damaging the kidneys and using phloridzin the excretion of the sugar almost constantly began later than in control animals and did not reach so high a point. He subsequently used diuretin, a substance which he has previously shown will produce a hepatogenous glycosuria, and found that previous damaging of the kidneys had practically no effect upon the glycosuria produced by the diuretin, though chronic kidney lesions caused some slight protraction of the

¹ Zeit. f. klin. Med., Bd. XLII, S. 160.

time between the administration of the drug and the appearance of glycosuria. He therefore decides that while disease of the kidneys may act antagonistically toward artificial glycosuria, this is not necessarily the case.

Lucibelli¹ has investigated the **effect of injection of glucose into rabbits**, injecting it in the muscles and administering it subcutaneously. The injection of 2% of the body weight of the animal caused death. Smaller doses produced a decrease in the resistance of the animal toward intoxication, though the subjects gradually became more accustomed to the injections, and finally would stand doses which in the beginning would have killed them. There was no evidence, however, that an antitoxin was produced in blood-serum through prolonged treatment. He noticed that in animals killed by injections there was a gelatinous edema around the point of injection. If the animals lived, this was gradually absorbed. Sometimes there was dry gangrene over the most prominent portion of the swelling.

J. Wohlgenuth² has separated the **hexose carbohydrate constituent** from vegetable albumin and lactalbumin by boiling the albumin solution with hydrochloric acid of 9% to 10% strength. A pentose was obtained from a nucleoproteid derived from the liver. Casein, vitellin, and gelatin yielded no carbohydrate constituent.

B. Schöndorff,³ in investigating the question of the **production of glycogen from albumin**, reached the conclusion that glycogen is not produced in the animal body from protein bodies which do not themselves contain carbohydrates. He fed a series of frogs on casein, which is free from carbohydrates, starved others, and used a third series as controls. He found that the use of casein caused an increase of glycogen of only 0.01 gram per 100 grams of frog, hence, practically speaking, no increase at all. The use of casein did, however, cause reduction in the consumption of glycogen as compared with the conditions found in the starved frogs. Schöndorff believes that these results demonstrate that glycogen is not produced from pure protein not containing carbohydrate.

Strodomsky⁴ has investigated the **influence of various protein bodies upon the sugar excretion in diabetes mellitus**. In 2 cases he gave an equivalent amount of beef, tropon, plasmon, calves' liver, kidney, thymus, and fish during different periods. The use of liver always caused the greatest increase in the sugar excretion. The least increase was observed in one case when plasmon was used, and in another at the time tropon was used. Fish always increased the sugar excretion more than did beef. The use of thymus, liver, and beef caused no appearance of pentose in the urine, and he decides that the diabetic can either not separate pentose from those substances, or that pentoses are produced and are transformed into glucose or oxidized into HC_2O and CO_2 . Nitrogen excretion was increased in a more severe case, and

¹ Gaz. degli Ospedali e delle Cliniche, 1900, No. 126.

² Berlin. klin. Woch., Aug. 13, 1900.

³ Pflüger's Arch., Bd. LXXXII, S. 60.

⁴ Zeit. f. diätet. u. physikal. Therap., Bd. IV, H. 4.

was normal in another case which was of moderate severity. The nitrogen excretion was not parallel to the sugar excretion, but tended rather toward the contrary. The phosphorus excretion gave no indication of increased nuclein destruction when liver and thymus were given; it was in the one case slightly increased, but in the other normal. It ran parallel to the sugar excretion. The excretion of uric acid was parallel to that of the phosphates. Diacetic acid was not observed in either case. The general conclusion which Strodomsky reaches is that the diabetic produces varying amounts of sugar from different forms of protein.

T. Rumpf¹ discusses the question as to the possibility of the **origin of sugar from fats**. After reviewing the literature he reports the experiments which he has undertaken with Grunow, Hartogh, and Schumm. They produced phloridzin glycosuria in dogs after accustoming them to a diet containing a small amount of protein and a large amount of fat. The amount of nitrogen in the urine and the amount of sugar were estimated for 5 periods of 5 days each. It is generally accepted that if the nitrogen in the urine is equal to one-sixth or one-seventh the amount of sugar, it is possible that all the sugar may have been produced by protein metabolism; and the possibility of sugar formation from fats can be demonstrated only when the amount of sugar is persistently more than seven times the amount of nitrogen. Rumpf presents tables to show that in one period of 5 days the amount of sugar averaged 8.9 times the amount of nitrogen. There was no evidence of a nephritis, and hence no evidence of retention of nitrogen during this period; hence he decided that there was evidence in this experiment of sugar formation from fat. The coincident estimation of the amount of SO_3 and P_2O_5 showed no relative increase of the P_2O_5 excretion. This was testimony against Blumenthal's belief that in diabetes albumins which are especially rich in phosphorus are broken down.

Charrin and Guillemonat,² after extensive experimentation upon rabbits by acidifying them with oxalic, lactic, and citric acids, and "mineralizing" them with sulphate and phosphate and chlorid of soda, and then injecting various amounts of sugar, conclude that the **mineralizing process favors the elimination and consumption of sugar**. They think that a lessened degree of oxidization, due to the presence of acids, may account for the results.

Traumatism and Diabetes.—N. Haedke³ reports his examinations in a surgical clinic of a series of 25 patients, who had sustained injury about the head, for the presence or absence of glycosuria. In 15 of the cases, or 60 % of the whole number, he found distinct alimentary glycosuria. This could not be attributed to the anæsthetization, which was undertaken in most of the cases after the injury. Arteriosclerosis and alcoholism were also excluded as far as possible, and of 20 other cases that were alcoholic only 2 showed alimentary glyco-

¹ Dent. med. Woch., Oct. 4, 1900.

² Gaz. Hebdom. de Méd. et de Chir., July 9, 1900.

³ Dent. med. Woch., Aug. 2, 1900.

suria. Hence he decides that the glycosuria was in direct relation to the injury, and he terms it metatraumatic. In none of these cases did permanent spontaneous glycosuria result. The work showed, however, a tendency, after injuries about the head, to disturbance of carbohydrate metabolism. This is known sometimes to result in permanent diabetes.

P. Vergely¹ describes a case of **traumatic diabetes** in a woman of 68 who had injured her chest and abdomen in a fall. The injury itself produced no evident results locally. It was, however, followed after a few years by symptoms of angina pectoris. After relief of this attack she exhibited polyuria, thirst, and glycosuria. The woman had decided arteriosclerosis. The existence of diabetes before the accident could not be excluded, as the urine had not been examined by Vergely; but he believes, since symptoms were absent, that there probably was no glycosuria at this time; the woman had had, however, a severe emotional shock 3 years before in the loss of her husband. After reviewing the literature Vergely decides that traumatism often causes an onset of diabetes in persons who are predisposed, and that if any suspicious symptoms occur after trauma, the urine should be examined repeatedly with care; he especially insists that if unusual nervous symptoms occur under such circumstances, or if anginoid attacks occur, diabetes should be looked for. Anginoid attacks are not uncommonly seen in diabetes.

W. Spitzer² describes a case of what he terms **traumatic diabetic coma**. The patient was an intelligent man, a professor, who had had a very mild glycosuria for years, but who had never shown acetone or diacetic acid, and whose ammonia excretion scarcely rose above 1 gram per day. The case was easily controlled. On the 27th of June, however, the patient broke his clavicle, and was greatly excited by the accident. His glycosuria at once increased very largely, and the urine on the next day showed 5% of sugar and gave an intense reaction for acetone and diacetic acid. The large excretion of sugar continued, and in spite of some improvement after the use of stimulants and large amounts of alkalies, the patient gradually went into coma and died about 10 days after the accident, with all the evidences of severe acid intoxication. Spitzer believes that normally the products of the carbohydrates unite with the acids formed in the system, and prevent intoxication with these acids. In this case he believes that the nervous shock caused large increase in the glycosuria, and that the interference with the metabolism of the carbohydrates left the acids unneutralized and thus brought on the acid intoxication and coma. Similar cases of coma following trauma in diabetes are referred to.

Pancreatic Diabetes.—E. W. Phillips³ reports a case of **pancreatic diabetes due to calculus**, which occurred in a man of 50. The patient had grown weak and had become emaciated; he occasionally passed blood from the bowel, had some greasy discharge in the interval, and his bowel movements were fatty-looking and offensive. He had no thirst and no polyuria, but the urine contained sugar. Jaundice was

¹ Rev. Med., Jan. 10, 1901.

² Dent. med. Woch., Nov. 22, 1900.

³ Lancet, July 14, 1901.

absent. Autopsy showed that there were numerous calculi in the ducts of the pancreas which occluded the main duct and several smaller ones. The patient had had repeated attacks of colic 20 years before.

Tests for Glucose in the Urine.—New tests and new methods for applying old tests continue to appear, though the well-known methods are quite satisfactory for all practical purposes. The new methods, for the most part, are cumbersome or uncertain.

E. Riegler¹ describes a **test for sugar** which he considers extremely sensitive. It consists in taking about 1 cc. of urine in a test-tube adding, roughly speaking, about 0.1 gram of phenylhydrazin, then about 0.5 gram of crystallized sodium acetate, about 2 cc. of water heated to boiling, and about 10 cc. of a 10% solution of sodium hydrate. Invert the test-tube rapidly five or six times, closing it with the thumb, and if more than 0.1% of sugar is present, the mixture will show a reddish-violet color within a few seconds. The tube should be held to the light to get the color well. The color should appear within 5 minutes at most, as otherwise mere oxidation from the air may cause a reaction.

M. Kowarski² recommends the following method for the **determination of the presence of sugar in the urine**: Five drops of phenylhydrazin is placed in the test-tube, 10 drops of strong acetic acid added, the mixture shaken, 1 cc. of saturated sodium chlorid solution added, 2 cc. or 3 cc. of urine added to this, the mixture heated for at least 2 minutes, and then slowly cooled. Characteristic crystals will be seen within a few minutes if the amount of sugar is as high as 0.2%. Smaller amounts of sugar cause the formation of crystals in a longer time—5 to 30 minutes. He considers that the test will show less than 0.1% of sugar.

Neumann,³ as a rapid and simple **method of demonstrating glycosuria**, recommends the use of a bulbous test-tube which is graduated, and into which one pours urine up to the mark "5," then one adds a solution of acetic acid saturated with sodium acetate up to the mark "7," and then 2 or 3 drops of pure phenylhydrazin. The mixture is boiled and evaporated to mark "3." After this Margulies⁴ recommends that the mixture be rapidly cooled in running water, when the crystals will appear almost at once. Neumann does not recommend rapid cooling, but considers the method, nevertheless, a very rapid one. It is said to show as little as 0.05% of sugar when 50% acetic acid is used; when glacial acetic acid is used, it shows about 0.1% of sugar.

V. Gebhart⁵ describes a new **test for sugar** carried out by the **use of compressed tablets** containing sodium carbonate and orthonitrophenylpropionic acid. One takes 10 or 15 drops of urine, adds 10 cc. of water, and then a tablet, warms carefully for 2 or 4 minutes, and if sugar is present the mixture becomes greenish and then dark indigo blue. The urine to be examined should always be diluted unless the

¹ Deut. med. Woch., Jan. 17, 1901.

² Berlin. klin. Woch., 1900, No. 48.

³ Berlin. klin. Woch., No. 53.

⁴ Berlin. klin. Woch., No. 40.

⁵ Münch. med. Woch., 1900, No. 1.

amount of sugar is extremely small. The reaction is said to occur only when sugar is present. It was positive in a solution of sugar of 0.03 to 100, not further diluted; it was also present in a solution of sugar of 0.05 to 100, which was still further diluted with water.

A. Sphaetbe¹ has investigated the **saccharometers** of Einhorn and Arndt-Fiebig, and the two recently devised by Lohnstein in order to determine their usefulness in practice. He finds that the improved Lohnstein instrument has not the points of error found in the others, and may be depended upon for accurate results.

E. Adler² discusses the Bremer and Williamson **blood reactions** in diabetes mellitus, and notes that as to Bremer's reaction, although it was present in 5 severe cases of diabetes mellitus, it was found in 2 cases of leukemia and in 1 normal subject. He considers this reaction to be lacking in diagnostic value. He tested Williamson's reaction in 130 cases, 9 of which were diabetes mellitus. He found it in all of these 9 cases, and in no other instance. He considers that Williamson's reaction occurs only with diabetic blood, and is of decided value in diagnosis.

L. Lipiawsky³ reports a new method for the demonstration of the presence of **diacetic acid in the urine**, which he considers may be absolutely relied upon. He states that in the investigation of about 400 specimens of pathologic urine it reacted only when diacetic acid was present, and showed this substance in dilutions as great as 1 to 40,000. To carry out the reaction one makes 2 solutions, the first a 1% solution of paramidoacetophenon, adding 2 cc. of concentrated HCl to increase the solubility of this substance, and shaking it thoroughly, the second solution being a 1% watery solution of potassium nitrite; 6 cc. of the first is mixed with 3 cc. of the second, an equal volume of urine is added and then a drop of ammonia; if the mixture is energetically shaken, a red color appears. One then takes 10 drops to 2 cc. of this red mixture, adds 15 to 20 cc. of concentrated HCl, 3 cc. of chloroform, and 2 to 4 drops of iron chlorid solution. The test-tube is corked, is gently but repeatedly inverted, and after a half minute to a minute, if there is any diacetic acid present, the chloroform takes on a characteristic violet color, the grade of the color depending upon the amount of diacetic acid present. If diacetic acid is absent, the color is yellowish or reddish. If a violet color appears, it persists for weeks even in the light.

Symptoms and Diagnosis.—Leo Schwarz⁴ studied the **elimination of acetone by the lungs** in a large number of cases of diabetes. As much as 1.1 grams may be expired during the day. In mild cases about 70% of the total acetone is eliminated by the lungs; in severe cases, only about 34%. The writer explains this decreased volatilization of acetone in bad cases by the fact that in these cases β -oxybutyric acid and acetic acid are circulating in the blood as well as acetone, so that a relatively smaller amount of acetone is brought to be eliminated.

¹ Deut. med. Woch., Aug. 2, 1900.

² Zeit. f. Heilk., 1900, No. 11.

³ Deut. med. Woch., Mar. 7, 1901.

⁴ Wien. med. Woch., Nov. 3, 1900.

When the carbohydrates are restricted, the acetone in the expired air is, in the majority of cases, twice or thrice as much as usual, and that in the urine 8 to 10 times as much. If in those cases in which the acetone is increased grape-sugar and like substances are added to the diet, a decrease in the acetone elimination is noted. The writer concludes that the origin of acetone can be traced to fat. He has often noted a marked increase in the elimination of acetone after administration of fats. He considers the elimination of acetone as a function of increased fat degeneration.

F. Blumenthal and C. Neuberg¹ discuss the possibility of the **production of acetone from albumin**. The question is as yet by no means settled, but, contrary to the older teaching, there has been recently a general tendency to the belief that acetone and its congeners are produced only from fats. The authors quite justly draw attention to the fact that there is, however, some experimental work indicating that casein in particular can be made to yield acetone, and that the flat statement that protein will not yield acetone is a narrow one. They draw attention to the fact that it has already been shown that iron salts apparently have an important catalytic action, their effects being to produce oxidation and reduction. They therefore took solutions of iron salts (ferrous sulphate) and added this peroxid of hydrogen to gelatin solutions, standing them aside in an oven for several days until the peroxid of hydrogen had disappeared. They found that the solution then contained an aldehyd, and also by using hydroxylamin they showed the presence of a ketone. That the ketone was acetone they consider that they have demonstrated by the Bamberger nitrophenylhydrazin test. They believe, therefore, that they have positively demonstrated the possibility of the production of acetone and an aldehyd from gelatin, and they feel justified in insisting that the iron salts should be recognized as playing a very important role in oxidative processes.

J. B. Herrick² discusses the occurrence of large numbers of **casts in the urine of diabetic subjects** immediately preceding the onset of coma, referring to the literature on the subject, and reporting 3 cases of his own in which this was observed. He also reports the presence of sugar with a specific gravity as low as 1004, and has seen a number of other instances of unusually low specific gravity in diabetes. He refers to other cases reported, the most marked of which showed a specific gravity of 1002.

J. B. Herrick,³ in a general discussion of the **diagnosis of diabetes mellitus**, directs attention to the various nervous symptoms which may be early indications of an unsuspected diabetes. He also notes a tendency to suppuration, sexual impotence, various psychic disturbances, and the like as suspicious symptoms.

W. Croner⁴ reports 3 cases of a **combination of tabes dorsalis with diabetes mellitus**, and discusses the relations existing between the two diseases. It is possible that the two may occur together as the

¹ Deut. med. Woch., Jan. 3, 1901.

² Am. Jour. Med. Sci., July, 1900.

³ Jour. Am. Med. Assoc., Jan. 26, 1901.

⁴ Zeit. f. klin. Med., Bd. XLI, S. 50.

result of another disease—*c. g.*, syphilis. Again, tabes can readily be conceived of as causing diabetes by involving those areas in the central nervous system which are important in regulating sugar metabolism. This has probably been the case in several instances reported. Further, it is quite possible that the two diseases may be present without having any actual relation with each other, and it is wholly possible that in some cases there may have been errors in diagnosis, as the pseudotabes produced by neuritis, which is seen in some cases of diabetes, is at times extremely difficult to distinguish from true tabes. The most characteristic points about pseudotabes are that bladder symptoms are absent and there is no pupillary disturbance. [The dependence upon a bladder disturbance in distinguishing tabes from neuritis will occasionally lead one into error, as in rare instances the nerves of the bladder are sufficiently involved by neuritis to cause very marked disturbance of the bladder.]

Mortality Records in Diabetes.—H. Stern¹ presents a series of tables concerning diabetes mellitus formulated from the mortality records in New York City for the year 1899. There were 202 records in all; 102 of the deaths occurred in males and 100 in females. The deaths in the four periods of the year did not vary to a marked degree, though they were distinctly fewer in summer. The greatest mortality was between the fifty-fifth and the sixty-fifth year of life. The greatest number of deaths occurred in Germans; there were 57 in this nationality, and the large number of deaths in Germans is attributed to the large number of Jews among them. The Jews furnished about 25% of the total deaths; about the same number were of Irish birth or direct Irish descent. One interesting fact was that in no instance were persons known to be Swedes, Norwegians, or Danes recorded as having died from the disease, and there were but 4 deaths of Italians from this cause. There were 60 persons recorded as having died from coma; whether it was true diabetic coma or not it was impossible to determine. The youngest subject of coma was 15 years of age; the oldest, over 83. The mean age of the subjects of coma was over 53 years. In the 9 instances in which the duration of the disease preceding the coma was noted it averaged 4 years and 5 months. In the same number of instances the duration of the coma was noted, and it averaged 44 hours. [Stern admits that the mortality records are too incomplete to make this study of very great value, and certainly the diagnosis, particularly in the case of coma, is so subject to criticism in general mortality records that there is little of value to be learned by this method.]

Treatment.—Zandy² reports a case of cured diabetes mellitus. The patient was a man of 50, who had certainly been ill for over 3 years. He passed as much as 274 grams of sugar in 24 hours, and the urine reached more than 4500 cc. Acetone and diacetic acid were found in the urine; β -oxybutyric acid was also probably present. He was put upon treatment, chiefly dietetic. The sugar was somewhat reduced, but not greatly, so salol was then used in doses of 4 grams per

¹ Med. Rec., Nov. 17, 1900.

² Deut. med. Woch., Aug. 2, 1900.

day. The sugar excretion sank at once, and on the fourth day had practically vanished. The man was seen about a year afterward, and he was still free from glycosuria or other symptoms of diabetes when upon a moderately free carbohydrate diet. The possibility of the production of alimentary glycosuria at that time was not investigated lest it should chance to bring back a permanent glycosuria. Salol was believed to have been largely responsible for the disappearance of the glycosuria and other signs.

Lenné¹ advises that in diabetes the amount of **albuminous nourishment** should not be more than that which corresponds to the excretion of 6.37 grams of urea per kilo body weight in 24 hours.

C. P. Gildersleeve,² in discussing the **rules to be followed concerning operation in diabetic patients**, states that one should always previously explain the possibility of a grave result, and that operation should not be undertaken on elderly subjects unless there is some very special reason. In rapidly spreading gangrene in which death seems certain to occur he recommends early amputation high above the gangrene, waiting, if it seems wise, until a line of demarcation is formed, but, if necessary, merely going above the probable line of demarcation. Dry, comparatively painless gangrene affecting the toes will usually run its course without causing any serious results, and he thinks should not be operated upon.

DIABETES INSIPIDUS.

A. Hoek³ reports a case of diabetes insipidus which occurred in a man of 30 who had been a **heavy drinker** for 15 years. The physical examination was normal, but the daily amount of urine was found to be from 5 to 7½ liters, the specific gravity being between 1002 and 1005. The urine was free from albumin or sugar. Methylene-blue was excreted in the urine 15 minutes after it was taken. The use of ergotin caused the urine to decrease to 4½ liters, and the continued use of this drug, together with limitation of the amount of water taken, reduced the daily amount of urine to 2½ liters. A notable and distressing symptom had been the necessity of urinating at least 3 times every night. These symptoms disappeared under treatment. The man had had similar symptoms when 22 years old, but they had disappeared after taking some drug, and had not been noticed again until 6 months before the present report, when he had marked thirst and enuresis had appeared.

G. Vaunini⁴ presents a study of the **metabolism in 2 cases** of diabetes insipidus, one a man of 47 and the other a girl of 14. The nitrogen metabolism experiments showed a retention in one case and a loss in the other. The absorption was good. The excretion of phosphates was excessive in the girl, while there was a retention in the case of the man. The insensible perspiration was found to be normal.

¹ Wien. med. Woch., Nov. 10, 1900.

³ Prag. med. Woch., 1900, No. 27.

² Jour. Am. Med. Assoc., Sept. 1, 1900.

⁴ Berlin. klin. Woch., July 16, 1900.

D. L. Edsall¹ discusses the **carbohydrates of the urine in diabetes insipidus**, reporting the results obtained in a case of diabetes insipidus by estimating the carbohydrates of the urine for about 10 days. The amount varied between 2 grams and 2.9 grams; they were therefore not increased. When the amount of fluids taken by the patient was very largely reduced, the amount of benzoylestere was reduced very largely also, the percentage reduction in the amount of urine being almost the same as the percentage reduction in the amount of carbohydrates. He therefore considers that the amount of carbohydrates is to a considerable extent dependent upon the diuresis, and believes that if a moderate increase in the carbohydrates of the urine in diabetes insipidus should occur, it might, in considerable part at least, be explained by the excessive diuresis that occurs in this disease. Coincident estimations of the nitrogen of the urine were undertaken to see whether there was any indication of formation of the unfermentable carbohydrates from the body protein. The diet was kept constant so that if the carbohydrates were formed from the body protein variations in the carbohydrates would probably be coincident with similar variations in the nitrogen excretion. No regular variations in the proportion of the amounts of nitrogen and carbohydrates was, however, to be seen. He also directs attention to the fact that the figures he obtained varied little from day to day, while those which von Althaus reports from his estimations of a normal subject showed variations as great as 1.5 to 5.1 grams. Edsall's patient was on constant diet, and the diet of von Althaus's patient was apparently not regulated. It seems probable, therefore, that the amount of carbohydrates in the normal urine depends to a great extent upon the diet, and that the carbohydrates are in chief part derived from the food rather than formed in the body. He considers that the estimation of the unfermentable carbohydrates may be of importance in determining the existence of diabetes mellitus in the rare cases when glycosuria disappears under the influence of an infection or from other causes, and that the method may also prove to be of value in investigating cases in which there is a marked tendency to alimentary glycosuria or a distinct predisposition to diabetes mellitus.

GOUT.

Etiology.—O. Loewi² contributes some **investigations concerning the metabolism of the nucleins**. He particularly directs attention to the possibility of a production of nuclein in the body from other substances than nuclein, and notes that it has been shown by the work of others that this can take place. In his work he determined the influence of nucleins in the food upon the excretion products in the feces and in the urine. His conclusions were that the nucleins of the food are in part split up in the intestine, the phosphoric acid of this portion of the nucleins being excreted in the feces while the nitrogenous portion is absorbed. The greater part of the nucleins, however, is not broken up in this way, but

¹ Am. Jour. Med. Sci., May, 1901.

² Arch. f. exper. Pathol. u. Pharm., Bd. XLV, H. 3 u. 4.

is absorbed *in toto*, the phosphoric acid remaining in organic combination. It is possible to cause a retention of nitrogen and phosphoric acid through feeding with nucleins, the proportion of retention of these bodies being the same as that contained in the nucleins given in the food. The addition of nuclein to the food increased, under some circumstances, an already existing retention of nitrogen and of phosphoric acid. Excepting uric acid, he found no end-products of nuclein metabolism in recognizable amounts in the urine of a man who was taking nucleins. The addition of guanin in combination with nuclein to the diet caused a marked increase in the uric acid excretion. The uric acid excretion is normally purely dependent upon the food. This last statement is in direct opposition to that of Burian and Schur, who consider that the uric acid excretion is to a considerable degree dependent upon the characteristics of the individual, even when normal subjects are studied. Loewi criticizes the work of these authors, and makes the very proper statement that a number of their conclusions relating to this point are wholly contradictory, and insists that his conclusion was reached after observing 3 persons who were under exactly the same conditions of metabolism. He believes that if persons are observed under wholly similar metabolic conditions the uric acid excretion will be found to be just about the same in all normal subjects. If the nitrogen balance varies in the different persons studied, the uric acid excretion will also vary; he thinks that lack of proper control of general nitrogen intake and excretion explains the results obtained by Burian and Schur. The statement that no end-products of nuclein metabolism excepting uric acid were found in notable amounts is based upon the fact that he found no increase of nitrogen or of phosphorus after nuclein intake which indicated increased excretion of anything except uric acid. [He did not investigate the amount of xanthin bases, and it seems quite possible that these may have been excreted in larger amounts than normal without this excretion being evidenced by any notable increase in the nitrogen or P_2O_5 excretion.] The observation that nuclein intake increases the nitrogen and P_2O_5 retention is a very interesting one, but one which he feels obliged as yet to leave without further discussion, and without theorizing concerning its meaning or importance. [It is, however, a very interesting observation in relation to the fact that the subjects of gout tend between attacks to show a notable nitrogen retention, and even a P_2O_5 retention.]

Freundweiler¹ refers to his previous work concerning the **effect of suspensions of sodium urate when injected into the tissues**, and reports some further work. Hypoxanthin and xanthin, which he used as examples of substances from which uric acid may be formed by catabolism in the economy, produced no uric acid deposits when injected, and the same was true of ammonium lactate and glycecol, which he used as examples of substances from which uric acid may perhaps be formed synthetically. He believes, therefore, that local production of the uric acid in the gouty nodules is improbable. He also believes that if uric

¹ Deut. Arch. f. klin. Med., Bd. LIX, H. 1 u. 2.

acid crystals are present in the tissues they do not cause a deposit of circulating uric acid, even when the amount in the blood is artificially increased. Intravenous injection into rabbits and ligation of the ureters in fowl caused no deposit of uric acid, and local alterations of the alkalinity of the tissues had no influence. A mere necrosis of the tissue did not seem to cause a deposit of uric acid, even when it was deposited in various portions of the body distant from the necrotic areas, as in fowl whose ureters had been tied. Uric acid was deposited, however, in recently inflamed tissue. Freundweiler reaches the following conclusion concerning the production of gout. He believes that it is due to an increase of uric acid in the body tissues and fluids (thus holding to His's views), and that it is a typical constitutional disease. He believes that because of the persistent increase of uric acid the organism tends to local inflammatory processes, and that if such inflammatory processes reach their acme at the same time that there is a high excess of uric acid in the fluids (produced by food and other factors), then uric acid is deposited in the inflamed tissue; this increases the inflammation and produces the necroses first observed by Ebstein.

D. Duckworth¹ states with a positiveness that is not justified by recent investigations, that **uric acid** is produced in the kidneys through some alteration in the tissue unrecognizable by the microscope, a theory which is most strongly advocated by Luff. He considers that gout certainly depends upon uricemia. He thinks, however, that there is a strong nervous element in the disease, and that the disease is both hereditary and provoked by habits of life which cause undue nervous exhaustion, and while they may not produce gout in the subject, they may be the cause of the development of gout in the progeny. Paroxysms of gout, he thinks, are determined by nervous influences, probably dominated from a bulbar center, and the definite location of the attack is determined by weakness or injury in the joint affected. He speaks of gout as a hemohumeral malady. [We must assent to the statement that nervous influences probably play a very important role in the production of gout. As to uric acid, there is so much proof that there is no increase of uric acid in the blood and that uric acid itself is not the *materia peccans*, that it may be considered demonstrated that gout is not due to excess of uric acid in the blood. There is no good proof of Luff's theory that uric acid is formed in the kidneys.]

W. R. Gore² states that his **theory of the origin of gout** is that the disease is due to a toxin formed in the intestine, and that the disease is not due to the presence of uric acid in the blood.

M. Kruger and J. Schmidt³ direct attention to the fact that previously **trimethylxanthin** had not been found in human urine even when Kruger and Salomon studied 10,000 liters of urine. They consider that this means either that the organism of man does not produce trimethylxanthin from theobromin, or that the patients from whom the urine was obtained were not receiving theobromin-containing food in notable

¹ Lancet, Aug. 25, 1900.

² Brit. Med. Jour., Sept. 29, 1900.

³ Arch. f. exper. Pathol. u. Pharm., Bd. XLV. H. 3 u. 4.

amounts. That trimethylxanthin can be produced in the human organism, however, is shown by the experiments now reported. After taking 9.3 grams of theobromin they found 0.796 gram of trimethylxanthin, or, in other words, they discovered that 100 grams of theobromin furnishes at least 8.56 of trimethylxanthin; that is, that the human organism produces the same excretion products of theobromin as do the organisms of the lower animals studied by Kruger and Salomon.

W. His and T. Paul¹ report some interesting physical and chemie investigations concerning **uric acid and its salts in solution**. They believe that they have demonstrated that the common statement concerning the solubility of uric acid in water at room temperature (1:10,075 up to 1:16,700) is not correct, and that the solubility is really nearer 1:40,000; that is, that a liter of water when saturated with uric acid contains only 0.0235 gram. They believe also that they have demonstrated that uric acid is not more soluble in mineral acids than it is in water, but, on the contrary, is less soluble in acids. There is not even an increase in the solubility in HCl or sulphuric acid of six times the normal strength. They consider that estimation of the uric acid or its salts by precipitation through excess of HCl, or better, excess of sulphuric acid, gives exact results, if prolonged shaking is used, and if a correction of 2 milligrams per 100 cc. is added. There are various other more technical questions discussed in the paper.

Symptomatology and treatment.—G. J. K. Martyn,² in a discussion of the forms of **gouty eczema** and its treatment, describes the acute dry form, the acute moist variety, the chronic form, and a variety which he terms latent gouty eczema, which consists in a burning, itching sensation with no visible skin lesion. The treatment which he recommends is the avoidance of all articles of food which have been found to disturb digestion, the prohibition of alcohol, the administration of alkalies, the local use of an ointment or lotion containing carbolic acid. The diet should be in general regulated by the diminution of proteids and starch foods and all forms of food that cause acid fermentation. Certain foods the exclusion of which he particularly recommends are: all forms of alcohol, raw or cooked fruit containing much acid or fermentable sugar, and stimulating foods. He considers that climate has much influence upon gouty eczema, the sea being the worst location for persons suffering from this affection. He has seen no useful results from the use of so-called gout specifics in controlling the eczema, while the management of the disturbance of digestion and the use of alkalies produces valuable results. The bowels should be kept open, and in acute cases soothing lotions should be used, while for the dry irritable forms he finds liquor carbonis detergens the most valuable preparation. If the eczema is widespread, baths are very valuable.

M. Goto³ has found that **uric acid forms a peculiarly firm combination with nucleinic acid**, and that it is not precipitated out

¹ Zeit. f. physiol. Chemie, Bd. XXXI, S. 1 u. 64.

² Brit. Med. Jour., Oct. 13, 1900. ³ Zeit. f. physiol. Chemie, Bd. XXX, S. 473.

by concentrated HCl. The addition of small amounts of sodium nucleinate, produced from hops, or of sodium thymylate to sodium urate results in some alteration which prevents the precipitation of the uric acid and the action of either HCl or carbonic acid. Goto believes that it is quite possible that nucleinic acid and thymic acid may prove to be of a good deal of therapeutic importance because of their power of combining the uric acid and holding it in solution.

W. Rubzow¹ discusses the **effects of alkalies and certain new drugs in producing solution of uric acid**. He made subcutaneous injections of very small doses (about $\frac{1}{4}$ grain) of the chromate of potash in doves, and in this way produced deposits of uric acid. He then administered alkalies or other drugs subcutaneously or by mouth. He found that urotropin, uricedin, and chinic acid were entirely without effect in a solution of the deposits, while piperazin and lysidin had some effect. Lithium he considered absolutely poisonous under these circumstances. The subcutaneous injection of all these drugs caused a marked local reaction. The uric acid deposits were not prevented by any of the substances used, excepting by piperazin and lysidin. The action of lysidin was more marked in that it apparently caused some solution of uric acid deposits in the kidney. He recommends further clinical use of lysidin in gout.

OBESITY.

A. Jaquet and N. Svenson,² in discussing **metabolism in obesity**, direct attention to the fact that there has never been any proof of a condition in which there is suboxidation of fats, and obesity as a result of this. They believe that they have shown the existence of this condition. In investigating 3 obese subjects they found, as have other observers, that the respiratory interchange was normal during periods of temporary abstinence from food, but they made the important observation that after taking food there was a much less marked and much shorter increase in the oxidative process than is usually seen in normal persons. This observation they consider sufficient explanation of the occurrence of excessive fat deposit in these persons. The reaction of the respiratory interchange to muscular exercise was not the same in all the subjects, and it seemed to depend upon the condition of the organs. One person investigated, though obese, showed about normal reaction. In the two others the increase in the oxygen consumption was comparatively slight. They make the interesting statement that the use of thyroid extract in one person caused a profound diuresis, and they believe that in this person, and perhaps in others in whom a loss of weight has been observed after the use of thyroid, the decrease in weight may be attributed to the loss of water; but in other persons thyroid extract caused an actual increase of nitrogen metabolism, and also seemed to increase the oxidative processes after taking food; hence it seemed to make the condition in these subjects more nearly approach the normal,

¹ Bolnit. Gaz. Botkina, Nos. 36, 38, and 39.

² Zeit. f. klin. Med., Bd. XLI, H. 5 u. 6.

and the influence upon the obesity was attributed in these subjects to the influence upon general metabolism. Probably this is the manner in which thyroid most commonly acts.

E. H. Kisch,¹ in discussing the **treatment of obesity**, states that he allows his patients daily 160 grams of albumin, 80 grams of carbohydrates, and 11 grams of fat, thus greatly reducing the fats and the carbohydrates. Fluids he allows in the quantity desired in plethoric cases, while he restricts them in anemic individuals. He gives regulated walking exercise, having the patients carry pedometers in order to register the distance which they have walked. The condition of the muscular strength is tested regularly by the dynamometer, and if the strength tends to decrease, the treatment is considered too rigorous. The condition of the heart is also carefully studied by the sphygmograph. In regulating the amount of water he recommends that the amount ingested be carefully compared with the amount eliminated in the urine, and in fat anemics in particular it should be seen to so far as possible that the amount given is just about the amount that will be quickly eliminated in the urine. It is extremely important to make careful determinations of the condition of metabolism in the treatment of obesity if the subjects are debilitated; but this is a difficult matter. If carried out properly it gives a much more satisfactory idea as to whether the treatment adopted is wholly safe and without any unfavorable effects.

ADDISON'S DISEASE.

E. G. Trevithick² describes a case of **Addison's disease of acute course**, the illness lasting only about 2 months, in which he gave suprarenal extract late in the course of the disease. The preparation was without effect. An autopsy showed tuberculosis in a number of organs, but the tuberculosis was not active and the adrenal bodies were not tuberculous. The latter, however, were fibrous.

C. G. Willson³ describes the case of a woman of 24 who was admitted to the hospital with the history that 4 days before she had been taken with a severe attack of vomiting and diarrhea. The gastrointestinal disturbance still continued to some extent, and was accompanied by marked prostration. The skin appeared dark, but this was said by the patient to be her normal color. She died about 40 hours after admission. The autopsy showed no notable changes, excepting enlargement of the suprarenal glands, which proved upon section to be due to collections of cheesy tuberculous material. The semilunar plexus and the adjacent sympathetic nerves were found involved in dense masses of fibroid tissue, and the case was considered to be one of Addison's disease.

Chas. R. Box⁴ has tested the **value of suprarenal extract** in cases of **Addison's disease**, and reported some of his results in the St. Thomas Hospital reports. In 6 of 8 cases suprarenal extract was ad-

¹ Berlin. klin. Woch., Sept. 24, 1900.

³ Medicine, Feb., 1901.

² Lancet, July 14, 1900.

⁴ Practitioner, May, 1901.

ministered, all of these cases being under practically daily observation. He has since seen 2 other certain cases and an uncertain one, and in 2 of these the patients have been placed under suprarenal treatment. The results so far have been disappointing. Unfortunately, as he says, most of the patients suffering from this disease are in the last stages when the diagnosis is made, and it is often impossible in these to administer the remedy on account of the constant vomiting, etc. Of his first 6 patients treated with suprarenal material, 4 were in the later stage, and soon died. In the first of these 4 cases the glands could not be administered by the mouth, on account of vomiting. In the second case the suprarenal was administered for 20 days at the rate of one and one-half sheep's glands daily. The third patient received during 10 days 90 grains of suprarenal substance; and the fourth received during 15 days 1305 grains of suprarenal extract. None of these patients showed the slightest improvement. The 2 other of the first 6 persons were treated for longer periods, one living for 95 and the other for 121 days. During these periods the first took 3255 grains, the second 7200 grains of suprarenal extract. There were occasionally periods of apparent improvement, always followed by a return of the previous symptoms. The remissions were no greater than occurred naturally, and there was no permanent improvement in either case. The suprarenal preparation used was freshly made and mixed with tragacanth, with a little salicylic acid for preservation. The author expresses doubt as to the correctness of the assumption brought forward by Schafer and Oliver, that the active principle is not destroyed in digestion. He bases this opinion on his own experience as well as that of some others. In his later cases he has attempted subcutaneous injections. He found that only small doses could be given in this way, as painful swellings arose in spite of all precautions. No improvement occurred. Another patient still under treatment seemed to show slight improvement though the case had not yet terminated.

In connection with these references to Addison's disease, the following reports on **suprarenal hemorrhage** are of interest:

Talbot¹ reports **2 cases of hemorrhage into the suprarenal bodies**. Still,² who had collected and published cases recorded up to that date, had divided them into three groups: (1) Those occurring within a few hours or days of birth; (2) those occurring later, when the suprarenal lesion is a complication of some disease, usually of the respiratory tract; (3) those in which death occurs after an acute illness of 2 or 3 days' duration, marked with purpuric or bulbous eruption. The suprarenal eruption appears to be part of the disease. Talbot's cases were both infants with a history of sudden onset, vomiting, abdominal pain, convulsions, and a temperature of 100° to 101° F. There was no purpura. In one of the cases there was slight bronchitis.

Arnaud³ has collected a series of **80 observations concerning suprarenal hemorrhage**. The symptoms of the condition he finds to

¹ St. Barth. Hosp. Rep., 1900.

² London Path. Soc. Rep., 1898.

³ Arch. Gen. de Méd., July, 1900.

be extremely vague, and it is often practically impossible either to make the diagnosis or to have a justified suspicion of the condition. Symptoms of Addison's disease are, as a rule, absent, though in cases which have some prolongation there may be bronzing of the skin and asthenia. Commonly death occurs too quickly to allow of the occurrence of such symptoms. In some cases there are symptoms of peritonitis; sometimes there are merely symptoms of profound nervous shock, with perhaps excitement, delirium, and convulsions, soon followed by death. This is perhaps the most common clinical picture presented. Such cases are very properly called suprarenal apoplexy. In other cases there are signs of a mass in the suprarenal region which usually proves to be a large hematoma. The cause of the hemorrhage is obscure, but is probably due to degenerative changes in the vessels, or to chronic passive congestion. Infection may produce the condition, probably through secondary vascular changes.

RHEUMATOID ARTHRITIS.

H. A. Elliott¹ describes a case of **rheumatoid arthritis** in which there was **ankylosis of practically every joint**, even the hips and the whole spinal column being apparently immobile, excepting slight motion in the right hip and some of the phalanges. Some teeth had been removed in order that the man might be fed, since the jaw was set. He had been helpless for 13 years. His disease had begun when he was 21.

OSTEOMALACIA.

E. O. Croft² reports a case of **osteomalacia** in a woman of 35, which had advanced to such a degree that the woman **could not stand or walk alone**. The removal of both ovaries caused such rapid improvement that 4 weeks afterward she could move much more freely, the pain was decreased, and there was a subsequent decided improvement. The phosphoric acid excretion was diminished 20 to 30 grains a day after operation. Croft considers that oophorectomy acts in this disease by diminishing the amount of phosphates excreted; this is probably due, as Curato and Tarulli suggest, to removal of an internal secretion of the ovaries, which, they think, has the power of oxidizing phosphorous compounds, and thus removing them from the bone.

GENERAL CONSIDERATIONS REGARDING METABOLISM.

G. Kövesi³ describes some interesting results which he obtained from the investigation of the **nitrogen metabolism in the aged**. He directs attention to the fact that while there is a general statement to be found in many writings that metabolism is reduced in the aged, this statement is chiefly based upon speculation, since there have been but

¹ Med. Rec., Nov. 17, 1900.

² Lancet, Aug. 25, 1900.

³ Centralbl. f. innere Med., Feb. 2, 1901.

few satisfactory studies of the question. He investigated 2 persons, aged respectively 76 and 78 years, and presents a series of tables. His conclusions are that the demand for food calories is much reduced in old age, and that the calorie demand per day is lower than has previously been stated. He found that he could reduce the calories to 20 per kilogram of body weight without any nitrogen loss. The absorption of nitrogenous food from the intestine was about normal. He was able to reduce the amount of nitrogenous intake to a most remarkable degree and still show a nitrogen retention, owing to the marked reduction of the demand for nitrogenous food. Some striking figures in this connection showed an intake of only 6.572 grams of nitrogen per day, with a total food value of 26 calories per kilo of body weight, and yet a positive nitrogen balance of 0.48 gram. There was also a loss of 0.539 gram of nitrogen in the feces, so that the subject absorbed only about 6 grams of nitrogen and yet maintained a positive nitrogen balance. A positive nitrogen balance of more than 3 grams, on the average, was also seen with the use of 10.5 grams of nitrogen in the food, and with a total food value of only 20 calories per kilo of body weight. Kövesi directs attention to the fact that these alterations in old age are practically all of quantitative nature, and consist in reduction of metabolism; while, on the contrary, other atrophic conditions, such as those seen in carcinoma, diabetes, and tuberculosis, are associated with nitrogen loss and with a qualitative change of metabolism. He believes that this indicates that the cause of the involution cachexia of old age is to be found in actual disturbance of cell function. The cells have lessened demand for nitrogenous substances; they are less active in function, and therefore are themselves broken down; to a lesser degree, the intracellular metabolism is itself reduced in activity; therefore there is a reduction of the demand for calories.

Thumin¹ has made investigations of the **influence of oophorin upon the protein metabolism** in a human subject. The patient was a woman who had had her ovaries removed. After using oophorin throughout various periods, he found that the woman showed nitrogen retention, which was much more marked during the periods of the use of oophorin. He therefore decides that this substance does not cause break-down of body tissues, at least when used over brief periods.

L. B. Popelsky² considers that Gertsen's work and the conclusions reached therefrom are erroneous, and that the **spleen has no influence upon the proteolytic ferment of the pancreas**. He has carried out careful investigations after the method of Schiff, and his only result was to determine to his satisfaction that the spleen does not have any specific action upon trypsin. He explains the results obtained by others by referring to the fact that ferments have been found in various regions in the body. In his belief they are probably mainly derived from the destruction of leukocytes. If such ferments are present in the spleen, they are probably not produced by the spleen itself, but are carried there by the blood. The occurrence of digestive leukocytosis means also, as

¹ Therap. der Gegenwart, 1900.

² Vratel, Feb. 3, 1901.

a consequence, increased destruction of leukocytes; hence these ferments would be formed in larger amounts during digestion, and during digestion the spleen is likely to contain these ferments in larger amounts.

DISEASES OF THE THYROID GLAND.

EXOPHTHALMIC GOITER.

Etiology and Pathology.—R. Breuer,¹ in discussing the etiology of exophthalmic goiter and thyroidism, states that he **considers the chronic iodine-poisoning of the older writers to have been acute thyroidism.** It was observed chiefly in cases of goiter in which iodine treatment had been used. He describes a series of cases in which **acute thyroidism followed the administration of iodine.** He believes that the iodine acts by causing absorption from the gland of toxic substances contained within it. In the case of a woman of 56 who had goiter, and who was given sodium iodide in doses of about 13 grains a day, the goiter became reduced in size, but the woman lost flesh, developed tremor and nervous excitability, with rapid pulse. Stopping the iodine and the use of bromids caused the symptoms to disappear. A similar case in a man is reported. In another case, that of a woman of 58 who had an old goiter, potassium iodide was used for joint pains. Similar symptoms, together with diarrhea and von Graefe's signs, appeared. Another woman who was given sodium iodide for an eye affection also showed weakness, emaciation, atrophy of the breasts, tremor, palpitation, and diarrhea. None of these patients had previously shown any symptoms of exophthalmic goiter. He describes another series of cases in which **mild symptoms of exophthalmic goiter were greatly increased by the use of iodine.** In one case, that of a woman of 27, who had previously had exophthalmic goiter, but had recovered, the symptoms returned after an application of iodine over a bursal swelling. [The experience of many other clinicians has been that chronic iodism produces symptoms almost or fully indistinguishable from thyroidism. The actual relation of the iodine compounds of the thyroid gland to exophthalmic goiter is, however, not yet clear.]

R. Broeur² describes the case of a man of 43 who had an **acute suppurative thyroiditis** due to staphylococcus infection, and who shortly afterward developed the typical signs of exophthalmic goiter, the disease ending fatally in about 6 months, with severe psychic symptoms. At autopsy the thyroid gland showed the remains of an abscess and diffuse hyperplasia. The parenchymatous tissues in general showed degenerative changes similar to those seen in toxic conditions. This case, in the author's belief, is **clear proof of the thyroid origin of the exophthalmos** of Graves' disease. Certain authors consider that the exophthalmos is not explainable by the theory of a thyroid origin of the disease, but this man had marked exophthalmos.

¹ Wien. klin. Woch., July 19, 1900.

² Berlin. klin. Woch., July 12, 1900.

R. Abrahams ¹ reports several cases which presented the symptoms of **exophthalmic goiter in 3 patients who had signs of syphilis**. The use of antisyphilitic treatment caused the disappearance of the symptoms. He believes that syphilis is probably frequently active as a cause of this disease. [That syphilis may be a contributory factor in many instances cannot be doubted; but there is no reason for giving it a prominent place among the causes of the condition. Syphilis is almost certainly made responsible for too many ills already, and it is necessary to present very convincing proof of its activity before it can be considered the main factor in causation.]

O. T. Osborne ² considers that **Graves' disease is more common than is usually thought**. It is likely to occur in the crowded centers of population, where the emotional type of women is more frequently seen. The exciting cause he considers to be frequently some disorder of the uterus or adnexa, associated with overwork or overstrain of the emotions, particularly when such overstrain comes at the menstrual period or during pregnancy. In the first 5 years of the attack he believes there is a tendency to improvement and a good chance of recovery, while after 5 years' duration the prognosis is bad. The prognosis is better in proportion to the age of the affected person. Menstruation and pregnancy nearly always cause temporary improvement in the symptoms, and the menopause is likely to be associated with entire cure. In the treatment, disorders of the uterus and adnexa should be looked after, and absolute rest in bed insisted upon. Among drugs he mentions the use of cardiac tonics if the heart is weak. He considers thymus gland valuable. Bromids should not be used over a long period, as they produce debility. Sodium phosphate, if used for a long time, is likely to give good results.

Symptomatology.—J. R. Arneill ³ describes a case of **acute Graves' disease** which occurred in a woman of 33. A goiter had appeared 7 months before death, and 5 months previously menstruation had ceased. Four months before death there had been a severe emotional shock, which was followed by tachycardia, nervousness, severe gastrointestinal disturbance, and great loss of weight. Toward the end there was severe fever. There was at no time any exophthalmos. An autopsy could not be obtained in the case. Arneill believes that in similar cases with very acute onset and course proper investigation would, in many instances at any rate, show previous indistinct signs of Graves' disease. The **acute course** he considers to be **due to some accidental factor**, such as shock or worry, which transforms the mild condition before present into one of serious acute Graves' disease. If the disease itself is not already present in the incipient stage, he thinks there is at any rate an unstable nervous system which responds to the strain by the onset of acute Graves' disease. The fatal acute cases usually end in death chiefly from the severity of the gastrointestinal disturbance.

¹ Phila. Med. Jour., Feb. 9, 1901.

² Med. News, Sept. 8, 1900.

³ Jour. Am. Med. Assoc., Oct. 6, 1900.

W. H. Harland¹ describes the cases of 2 soldiers, aged 29 and 30 respectively, who **suddenly developed the symptoms of exophthalmic goiter** after being in action.

J. A. Kirschi² reports a case of **exophthalmic goiter with symptoms of myxedema**. The patient was a woman of 33, who had had bad health for some months after typhoid fever, and who, after a fright occasioned by a fall, developed symptoms of exophthalmic goiter almost immediately. The symptoms of overaction of the thyroid disappeared largely after only 2 months, and the face and legs then began to exhibit a myxedematous swelling. The skin also became dry, the uterus atrophied, the goiter became tense, and the memory became poor. [A number of cases of this kind have been reported recently since attention was directed to them. They are evidences of the varied relation that different forms of thyroid disease may bear to each other. The subject was clearly discussed by Adami in an article reviewed in the YEAR-BOOK of 1901.]

Treatment.—Murray³ reports on the **use of thyroid extract in the last 10 years**—i. e., since the time of its introduction. Thyroid gland may be employed as the fresh gland of the sheep, or as liquor thyroidei or thyroideum siccum (B.P.). “One-eighth of a lobe of the fresh gland — m.ij of liquor thyroidei — gr. j of thyroideum siccum.” In myxedema, including the mild forms, often overlooked,—“in which the therapeutic test may be applied by giving the patient 10 minims of liquor thyroidei at bedtime each night for 3 or 4 weeks,”—and in cretinism the good results of well-directed thyroidal treatment are well known. Thyroid extract has proved to be efficient in the treatment of the simple parenchymatous goiter of adolescents and young adults, “where the thyroid probably becomes hypertrophied in the first instance in response to a demand for an increased supply of its secretion.” The thyroid secretion, ready made, is supplied, and so the work of the gland made lighter. In adenoma or cystic adenoma of the thyroid gland the treatment is of little use. “If there is one drug which should not be used in the treatment of exophthalmic goiter it is thyroid extract.” Thymus gland may be of some use in the treatment of Graves’ disease. In some skin diseases, as psoriasis and ichthyosis, thyroid extract has been used with good results, as also in obesity, as an adjunct to dieting. Complete recovery has taken place in cases of insanity treated with thyroid extract, and the treatment is worthy of further trial. In inoperable cancer of the breast “evidence seems to show that in cases which have not passed the menopause better results are obtained by the combined treatment than by either oophorectomy or thyroid treatment alone, and that in such cases the combined treatment is worth a more extended trial.”

M. Porges⁴ directs particular attention to the fact that he has observed in animal experiments that the **use of thyroid preparations was followed by an increased excretion of nitrogen and phosphorus**, which

¹ Brit. Med. Jour., Sept. 1, 1900.

² Wien. klin. Woch., July 5, 1900.

³ Practitioner, Mar., 1901.

⁴ Prag. med. Woch., 1900, No. 6.

lasted for weeks or months after the thyroid was stopped. He therefore considers that one is not in a position to say that thyroid causes no harmful results, even though a brief experiment seems to show no bad effects. He is strongly opposed to the use of thyroid in obesity. [There is evidence that proper attention to diet may offset the evidences of metabolic changes due to thyroid. Still, the author is right in saying that there is no good evidence that thyroid may be so given that it causes no bad results, and its use certainly demands caution.]

F. G. Haworth¹ reports a case in which **apathy followed the use of thyroïdin**. The patient was a girl of 16, who had slight goiter, and who was given thyroïdin in doses of 15 grains daily. After 3 weeks' treatment she appeared sleepy, had an uncertain memory, and any exertion produced free sweating. There was no disturbance of the gastrointestinal tract, but, owing to the apathy, she ate only when it was insisted that she should take food. She worked if work were demanded of her. While she had been fond of reading previously, she now complained that it made her head ache; she was also frequently subject to frontal headache when not using her eyes, and she kept to her bed a greater part of the time.

A. Jaenicke² reports his use of **thyroïdin in a case of tumor of the breast**, which was at first thought to be malignant, in 2 cases of large lymphoma (in the second of these there were multiple tumors without changes in the leukocytes), and also in 3 cases of marked enlargement of the spleen without alteration in the leukocytes. He describes rather marvelous results. He notes that one woman took within 6 years more than 4000 tablets each containing 5 grains of thyroïdin, and yet there were no bad results. These results are isolated, and there has been no cumulative evidence that thyroid has any influence upon neoplasms which would encourage one to use it with any anticipation of successful results.

THYREOPRIVUS AND MYXEDEMA.

F. Blum³ discusses some new methods, determined experimentally, for the **recognition and treatment of diseases caused by intoxication**. He has particularly directed his attention to thyroid conditions, and to the effect of **feeding with various forms of food after extirpation of the thyroid**. The main points in his results were the discovery that the use of exclusive meat diet resulted in a mortality of 96% in animals thus operated upon, usually from tetany, while with a milk diet the mortality was only about 60%; if, however, milk was first given and then followed by meat diet, toxic symptoms practically always appeared; a mixed diet of bread, milk, and meat showed no marked toxicity, hence it seems probable that the extractives in the meat have no special relation to the poison that is produced, and Blum thinks that the poison is elaborated from the meat itself. The poison

¹ Brit. Med. Jour., Sept. 1, 1900.

² Centralbl. f. innere Med., Jan. 12, 1901.

³ Virchow's Arch., Bd. CLXII, H. 3.

seems from his results to be produced from milk also, though in lesser amounts. He believes that it is produced in the gastrointestinal tract. The survival of certain of the animals experimented upon was apparently the result of the production of an antitoxic substance, for their blood-serum was to some extent protective against thyroid cachexia in other animals. He therefore decides that the thyroid gland neutralizes toxic substances circulating in the body, and that the iodine in the thyroid gland has no essential part in the function of the gland; he was led to this conclusion chiefly by the fact that iodine is absent in the thyroid glands of very young animals. Thyroid toxalbumin is produced by the neutralization of toxic substances, and is itself under some circumstances toxic. But animals may possess a natural immunity to this toxalbumin or acquire such an immunity. He considers that the **symptoms of thyreoprivus are not, properly speaking, symptoms of an autointoxication**, but of a flooding of the system with poisonous substances produced in the intestinal tract, and that the **most satisfactory treatment for the condition is a milk diet**. [This conclusion is certainly not in accord with the great mass of clinical and experimental evidence.]

H. Quincke¹ describes 2 cases which he calls **athyreosis in children**. The first occurred in a boy who was brought to the clinic when 6 months old because his tongue was thick and he swallowed badly. He had a somewhat cretin-like appearance, was stupid, had a thick neck, and the thyroid gland was found to be a hard mass about the size of a pea. The administration of iodothyron in this case caused moderate improvement. The addition of thyradin to the treatment caused a much more decided improvement. When the thyradin was stopped, the child grew worse, and when it was once more used the child improved again. After about 3 years' observation the child was lost sight of, having at that time improved moderately; the objective signs were little changed, but the child appeared somewhat more intelligent and could say one or two words. A year later it died of an intercurrent disease. The autopsy showed complete absence of the thyroid gland; the thymus was small, there were rachitic changes in the bones, and there was nothing left of the teeth excepting brownish stumps. Notable symptoms in the case were the presence of nystagmus, the shaking movements of the head, and the fact that the body length was not below the normal. A second case occurred in a girl who had been well until 15 months old, then began to show psychic changes, became stupid, lost the power of speech, no longer walked, and showed nutritive changes, particularly of the teeth. Iodothyron was used for a week. There was marked improvement after 7 weeks, the child soon appeared normal, and now, after 4 years, remains well. Notable facts about these cases were that in both the symptoms appeared only some time after birth, and in the first case there was evidence of an increasing atrophy of the thyroid gland. Hence it was considered that they were not cases of congenital absence of the thyroid

¹ Deut. med. Woch., Dec. 6 and 13, 1900.

function, and therefore not congenital cretinism; also, they ran a much more acute course than cretinism does and differed in the same way from myxedema; and, too, the skin, while it showed some horniness on the hands and feet, was generally soft and moist and showed no distinct changes. The children could not be considered cretins or subjects of myxedema, hence Quineke calls the cases subacute athyreosis. The remarkable action of the iodothylin in the second case he attributes to the probable assumption of vicarious action of the thymus, which was still large in this child. Quineke is convinced that myxedema and cretinism and cases such as these are due to loss of or quantitative change in the thyroid secretion, but he thinks that it is quite possible that the toxic substances circulating in the organism have an unfavorable action upon the other organs, and that the variations in the symptoms and in the influence of treatment may perhaps be largely explained in this way. **In some cases the thyroid is involved almost solely**, and in such instances the symptoms are fairly typical and readily respond to thyroid treatment. **In other cases the chief trouble is with other organs**, and in such cases the symptoms are atypical and thyroid treatment unsatisfactory.

Glynn¹ discusses "certain milder forms of constitutional trouble akin to myxedema, in which the functions of the thyroid are not in abeyance, but only abnormally diminished." The symptoms and signs of Murray's "early thyroidal fibrosis," or Hertoghe's "l'hypothyroïdie benigne chronique" are "lassitude, easily induced, visual and auditory hallucinations not uncommon," with "some yellowness or pallor of the skin of the face," "subcutaneous swelling, as a rule slight, and not well marked even in the eyelids, nose, or lips; dryness of the skin, with frequently scaly patches on the knees and elbows; falling out and premature grayness of the hair; decay of the teeth and unhealthy gums; enlarged tonsils; adenoids." Headache, constipation, and menorrhagia may be present. Glynn reports several such cases much improved by the use of thyroidal treatment. In these cases the therapeutic test may be used as a means of diagnosis.

Ewald² reported to the Berlin Medical Society a case of **myxedeme fruste** which occurred in a woman of 40 who had been well until after her marriage, when she had had some indefinite abdominal trouble. In 1898 she noticed swelling of her face and hands, and there was some loss of hair. Afterward there were nervous and digestive symptoms, consisting chiefly of loss of appetite with marked weakness, sleeplessness, vertigo, increasing apathy and restlessness, and palpitation. She improved on the use of thyroid tablets, but only moderately. **When sent to a mountainous region she became practically well**, but grew worse when she returned to her home. Arsenic caused some improvement, but it was not striking. The right side of the thyroid could be felt, but the isthmus and left half were apparently absent. The woman had also marked tremor of the hands, and when kneeling she had

¹ Liverpool Med.-Chir. Jour., July, 1900.

² Berlin. klin. Woch., Dec. 31, 1900, S. 1242.

such pronounced tremor that she fell unless supported. There was slight lagophthalmus, but Gräfe's, Möbius', and Stellwag's symptoms were absent, and there was no exophthalmus. Sensation was normal, there were no hysteric stigmas, and sugar and albumin were absent from the urine. A number of the characteristic symptoms of myxedema were absent. The surface of the skin was practically normal and was not dry; the hands, indeed, were cold and moist, and there was no notable swelling of the extremities.

A. Pedenko¹ reports a case of myxedema in a woman of 63 in which the **thyroid gland was apparently entirely absent**. He administered thyroïdin and raw sheep's thyroid with extremely good results.

F. M. Pape and A. V. Clarke² report the case of a man of 38 who **had the appearance of akromegaly**, and whose **oldest child, a girl 20 years of age, had what was thought to be congenital myxedema**. [A very suggestive report bearing upon the not infrequent association of symptoms of myxedema with those of akromegaly was that made last year by Ponfick, who found marked changes in both the hypophysis and thyroid in 3 cases of myxedema. This association of changes in the structure of the glands is, however, relatively rare, and the relation between the two diseases cannot be explained on a merely anatomic basis.]

DISEASES OF THE BLOOD.

CONDITIONS AFFECTING THE CONSTITUTION OF THE BLOOD.

E. Becker³ has studied the **effect of vasomotor influences, especially the action of cold**, upon the constitution of the blood, and reaches the following conclusions: (1) The effect of cold over the entire surface of the body causes a moderate increase in the number of erythrocytes and usually a greater increase in the number of leukocytes in the superficial capillaries. (2) These alterations of the constitution of the blood are partly the result of vasomotor influences, especially the result of loss of water from the blood; in less measure they are due to retention of blood-corpuscles in the capillaries. (3) The increase of leukocytes is due, in addition to the above reason, and in greater measure, to collection of these cells along the walls of the vessels in consequence of the application of cold. In pathologic conditions the alterations of the number of blood-corpuscles may be due to relief of stasis.

Zuelzer,⁴ **after poisoning a dog with pyridin, found that Bence-Jones's body was present in the urine**, a precipitate, soluble on heating, being produced by nitric acid and by other precipitants. The precipitated substances gave a reaction with Millon's reagent, with lead sulphid, and with the biuret test. These albumose-like bodies have

¹ Bohit. Gaz. Botkina, No. 29.

² Brit. Med. Jour., Dec. 1, 1900.

³ Deut. Arch. f. klin. Med., Bd. LXX, No. 1 u. 2.

⁴ Berlin. klin. Woch., Oct., 1900.

been found particularly in cases of disease of the bones associated with marked anemia, and striking anemia was present in this dog. Zuelzer suggests that the urine should be more frequently and more carefully examined for these bodies in various forms of grave anemia. [The presence of this substance giving the Bence-Jones reaction seems to be due to disease of the bone marrow rather than to anemia, and to neoplastic changes rather than to those associated with or producing anemia.]

J. F. Ransom ¹ describes some work on **saponin and its antidote** which is of interest in its relation to the red blood-cells. Saponin is a marked hemolytic poison. He found that the minimal dose that produced complete solution of dogs' corpuscles was 2 milligrams in 0.7 cc. of blood; no effect was observed from the same amount in 2 cc. of blood. It was found that the action was much more marked upon the centrifugated red cells than upon the serum itself. Saponin was still effective for the red cells in a dilution of 1 to 200,000, while no action was observed upon whole blood in a dilution of 1 to 40,000. There was a difference seen in its effect upon the blood of different animals, evidently owing to the different quantities of immunity substances present in these animals. The serum contained some substances which combined with and antidoted the saponin, and the same was observed with the red corpuscles, about 0.75 of either of these being sufficient to combine with 2 milligrams of saponin and destroy its action. Laking the blood and then centrifugating the stromas of the red cells led Ransom to the discovery that the stromas fixed the saponin. The substance that fixed the saponin was soluble in ether, and the chief component of the ethereal extract was cholesterol; hence it seemed probable that cholesterol was active in the fixation of the saponin, and this thought was confirmed by the discovery that the addition of cholesterol to saponin solution caused the latter to lose its hemolytic action upon various forms of blood. Cholesterol has been previously shown to have an immunizing effect against snake poison. It is evident that the **cholesterol of the blood-corpuscles and serum is a very important substance**; in the serum it acts definitely as an antidote. That portion in the red blood-corpuscles, however, really acts in furthering the effect of the hemolytic poison. So far as Ransom could determine, cholesterol is active only against saponin and members of the saponin group, but not toward other vegetable hemolysins or toward foreign serums. [This work is of much importance in that it gives a suggestion as to the ways in which valuable therapeutic results may possibly be obtained; and it also offers opportunity for gaining closer knowledge of the nature of hemolysis as it occurs under various circumstances.]

K. von Stejskal ² reports the **chemic conditions of the blood in a case of fever of chronic relapsing type** associated with enlargement of the lymph-glands. The patient was probably also a subject of tuberculosis. The man disappeared from observation, and consequently the exact conditions present in the case could not be stated. The general results were as follows: In the whole blood there was found a

¹ Deut. med. Woch., Mar. 28, 1901.

² Zeit. f. klin. Med., Bd. XLII, H. 3 u. 4.

reduction of the albumin and of the dry residue, with an increase of the water and salts; the amount of fat and cholesterin was decreased; the lecithin was about normal; the calcium and potassium had increased, the chlorids and iron had decreased, and the sodium was about normal. In the serum the most notable change was a decrease of the albumin and a consequent decrease of the dry residue and increase of the ash and water. All the components of the ethereal extract had decreased. Calcium was increased distinctly, the chlorids were decreased, the erythrocytes were poor in albumin, lecithin, and cholesterin, and relatively rich in water and salts—an evidence that they had imbibed plasma. The specific gravity of the erythrocytes had increased, the total amount of the plasma had correspondingly decreased and was poor in albumin, but relatively rich in water and salt. Imbibition of plasma by the red blood-corpuscles has been previously described by Herz from a morphologic standpoint under the name "acute swelling" of the red cells. Stejskal notes that the conditions described may be thought to be the result of insufficient nourishment, of the disease itself, or of the fever accompanying the disease. There was no reason for thinking that they were the result of inanition in this case. The increase of the salts in particular, and the fact that the patient was taking nourishment in large amounts, practically excluded inanition. The decrease itself may have been the cause, but we do not know with sufficient definiteness the effects of disease upon the chemie condition of the blood. A review of some previous work concerning the influence of mere high temperature upon the blood makes it seem to Stejskal **quite possible that the conditions described were due to the fever alone.** [This conclusion is necessarily guardedly drawn and can hardly be supported very strongly, since various other factors may have had more influence than the fever in a case of so mixed and uncertain a character.]

S. V. Stein¹ has investigated the influence of various chemicals upon the **production of hemoglobin crystals.** He used blood from guinea-pigs, which was rapidly defibrinated, a drop placed upon a slide, and then covered by a film of Canada balsam. Crystals occurred within 24 hours under ordinary circumstances. Various solutions were added to the drop before it was covered, and it was found that small amounts of water made the crystals smaller and paler, while several drops of water entirely interfered with the formation of crystals. Sodium chlorid caused the crystals to become smaller and the edges to become blunted, or entirely interfered with their formation. He observed similar effects from potassium chlorid, potassium chlorate, ammonium sulphate, and sodium sulphate; carbon monoxid aided in the formation of tetrahedrons of a deep red color; anhydrous sulphuric acid and hydrogen sulphid prevented the formation of crystals. Nitrous oxid did not have this effect.

R. Kobert² discusses **various forms of methemoglobin.** He found that by adding ferrieyanid of potassium to a filtered blood solution and then adding alkalis, the brown solution became red again, and this he attributes to the presence of a derivative of methemoglobin—

¹ Virchow's Arch., Bd. CLXII, H. 3.

² Pflüger's Arch., Bd. LXXXII, S. 603.

i. e., alkaline methemoglobin. He thought that alkaline methemoglobin might be present in the blood in methemoglobin-poisoning, and he believes that he has proved this spectroscopically. This is a point of some importance, as alkaline methemoglobin is more easily transformed in oxyhemoglobin than is the ordinary form of methemoglobin. He considers also that the methemoglobin which occurs in acid intoxication may be changed into alkaline methemoglobin in the same way through the action of alkalies. He also refers to photomethemoglobin, which has a red color, but has spectroscopic peculiarities. It is produced by the action of sunlight upon methemoglobin, and he believes occurs in the circulating blood when methemoglobin is present, through the action of the sunlight upon the peripheral vessels. Methemoglobin also forms with hydrogen peroxid a hydrogen peroxid methemoglobin. Kobert directs attention to the fact that alterations in hemoglobin are much more numerous than is customarily stated. He also found that hemoglobin and its derivatives, even in marked dilution, give absorption bands in the violet and ultraviolet, thus confirming the statement of Grabe.

F. Müller¹ contributes some observations concerning **the use of iron in anemias**. He proved that inorganic iron does increase the hemoglobin. By taking newborn pups and giving them no iron-containing food, mother's milk being the only diet, he ultimately produced anemia and increased this anemia by repeatedly drawing blood. This was repeated until the amount of hemoglobin was found to be constant and very low, and the red blood-corpuscles were also low. The administration then of inorganic iron in doses of 4 to 10 milliliters per kilo of body weight, a little more than the dose ordinarily given to man, showed a decided increase in the hemoglobin and red cells. The total hemoglobin was estimated, both that in the blood and that in the organs, and compared with that of control animals. He especially notes that even after careful and prolonged washing through the arteries and veins with physiologic salt solution about 10% of the total hemoglobin was found to be still in the bone marrow. He states that iron is absorbed into the blood-vessels and not into the lymph-channels as previous investigators have stated. He directs attention to the fact that preparations of iron which have more or less caustic effect are not well absorbed, and that they are not therefore suitable for use. Such a preparation is the tincture or the chlorid. Useful preparations are Blaud's pills and the oxytartrate. As to the method of **action of the iron**, he considers that he has shown that it is actually **due to the stimulating effect upon the bone marrow**, since after the use of iron he found that the marrow contained a much larger number of red corpuscles, and that there was a larger number of mitoses to be seen. He thinks that in chlorosis the same influence is active upon the bone marrow as in secondary anemias.

Aporti and Camillo² have made some studies of the value of **various metals in the treatment of anemia**, bleeding dogs repeatedly

¹ Deut. med. Woch., Dec. 20, 1900.

² Clinica Med. Ital., 1900, No. 8.

and giving them iron-free food, and at the same time administering iron, manganese, copper, zinc, gold, or mercury salts. Iron and manganese were the only metals which seemed to have any influence in improving the condition of the blood. The action of manganese was much less marked than that of iron, but it caused an increase in the amount of hemoglobin as well as in the number of red cells.

Cervello¹ has investigated the **influence of copper, zinc, manganese, and mercury** on the blood of dogs and chickens, and decides that these heavy metals act like iron and that they are of use in cases of anemia and chlorosis, causing decided increase in the hemoglobin.

L. Fürst,² in considering the pathogenesis and therapy of **anemic conditions in children**, states that he believes a congenital form of anemia due to heredity is not uncommon; habitual anemia of the parents, tubercular cachexia, malignant growths, bad nutrition, and unfavorable surroundings of the mother, together with other conditions occurring during pregnancy, are likely to result in anemia in the child. He describes an alimentary form of anemia which occurs in infants born healthy; it is often due to the prolonged use of milk which contains an insufficient amount of iron. There is a form of anemia observed between the fifth and the twelfth years which is associated with unduly rapid increase in height and a coincident reduction of the body fat. This he considers to be due to increased oxidative processes, and to the fact that the production of new blood-cells is not equal to the destruction of tissue. The anemia results because there is such marked necessity for the production of muscle and bone that sufficient blood cannot be produced. Another form of anemia is likely to occur between the twelfth and fifteenth years, particularly in girls who are still in school, and is the result of the strain upon the mind and of nervous influences; it is commonly associated with too much study and too little outdoor exercise. Finally, there are certain forms which result from acute hemorrhages from congenital tumors, from acute diseases, chronic lymphadenitis, constitutional diseases, and other conditions involving the blood-making organs. There is generally some decrease in the red blood-cells in these conditions, with a marked reduction of the hemoglobin. The treatment is in general chiefly hygienic and dietetic rather than medicinal. Iron preparations are usually of value.

The Red Corpuscles.—O. Moritz³ briefly reports, in a preliminary contribution, that he has **administered lead acetate** to rabbits, and has thereby produced in 5 of these animals more or less **decided basic degeneration of the red blood-cells**. He also produced marked basophilic granulations in the erythrocytes of rabbits by the subcutaneous use of **pyridin**, and, further, produced the granulations in a white mouse by administering lead acetate. He also states that he can confirm Hamell's statements concerning the **value of basophilic granulations in the diagnosis of lead intoxication**. He examined 6 workers in a lead factory, and found that all of these showed the granulations. Only

¹ Jour. des Pratic., Jan. 5, 1901.

² Therap. Monatshefte, 1900, No. 9.

³ Deut. med. Woch., Jan. 31, 1901.

1 of them at the time of examination showed symptoms of acute intoxication; 1 had had lead-poisoning years before. He has also seen the granulations in leukemia, malaria, sepsis, and the cachexia of carcinoma.

S. Kaminer¹ was led to make an investigation of the **poisonous effects of phenylhydrazin** by the director of a chemical laboratory, who observed that workers in phenylhydrazin showed marked symptoms of poisoning. Rabbits showed the symptoms that are well known,—*i. e.*, hemoglobinemia with consecutive anemia and nephritis,—but Kaminer also observed in those animals that if they died very early a true fibrinous pneumonia occurred. He believed that this was due to necrosis of the epithelium of the lungs, resulting from the action of the free hemoglobin, and to increase of the fibrin ferment of the blood, resulting from the destruction of the leukocytes.

Kaminer and Rohnstein² report some further studies on the influence of phenylhydrazin in the production of anemia. When injected into animals in large doses, death ensued within 48 hours, with reduction of the red cells to 1,000,000 or lower, and with the appearance within 6 hours of macrocytes and fragmentation of the red cells, and of nucleated red cells, some of them being megaloblasts. The red cells did not show poikilocytosis. There was **no evidence of the granular degeneration** described by Grawitz. The leukocytes were somewhat reduced. With smaller doses of the poison they produced a chronic anemia with reduction of the red corpuscles, the appearance of macrocytes and a few nucleated red blood-corpuscles, but without poikilocytosis. The **effect of large doses** upon the leukocytes was apparently **negatively chemotactic**, but in small doses it **increased the number**, thus acting as a positive chemotactic agent. The effect was therefore apparently similar to that of toxins. [Basic degeneration of the red cells has been described by others who have used phenylhydrazin and its derivatives.]

The Leukocytes.—H. Rubinstein³ discusses the **changes in the bone marrow in experimental leukocytosis**. He injected various leukocytotics, such as extract of spleen, deutoalbumose, streptococcic toxin, and turpentine, into rabbits, excising a rib before the injections and after, and after making thin sections of both, carefully counting the various cells in the bone marrow, and also examining smear preparations of the blood made before and after the injections. He reaches the following conclusions: Leukocytosis (in the sense of an increase of other cells than typical lymphocytes) is a function of the bone marrow exclusively. The result of the injection of the leukocytotic is an increase in the polymorphonuclear leukocytes in the blood, a decrease in their number in the bone marrow, an increase in the number of large homogeneous mononuclear cells in the bone marrow; these, in the course of their development, show granulations—in other words, become identical with myelocytes in their morphology, and afterward develop into

¹ Zeit. f. klin. Med., Bd. XLI.

² Berlin. klin. Woch., July 30, 1900.

³ Zeit. f. klin. Med., Bd. XLII, H. 3 u. 4.

polymorphonuclear cells through changes in the nuclei. With prolonged leukocytosis the myelocytes may come to constitute much more than half of all the cells in the bone marrow. The granulated cells of the marrow develop from the large mononuclear cells mentioned, through the development of granules in their protoplasm, the granules in their early stages being basophile. There was no evidence in the blood, the spleen, or the lymph-glands of the production of the older forms of cells in any of these situations. The large homogeneous mononuclear leukocytes develop from a mother form found in every bone marrow, which have the appearance of small lymphoid cells but which develop in the bone marrow alone, and are distinctly different from the lymphocytes of the lymph system. Since these cells are of other nature than true lymphocytes, Uskoff's teaching is erroneous, and the results which Rubinstein has seen from his experiments also show that Uskoff's teaching is not correct. The eosinophile leukocytes are, he states, derived also from the lymphoid cells of the bone marrow, but there was not the slightest evidence of the development of eosinophiles from neutrophiles either in the blood or in the bone marrow. **The course of the development of the leukocytes** which Rubinstein sketches is, first, a small lymphoid cell with a nucleus showing distinct structure and with a narrow, distinctly basophile, ungranulated protoplasm; next, a larger lymphoid cell with a larger nucleus, the cell showing decided structure and a broad granulated area of protoplasm; third, a large lymphoid cell with a nucleus which does not show marked structure, and has a broad ungranulated area of protoplasm, the nucleus staining distinctly; fourth, mononuclear ungranulated leukocyte which has the appearance of a large lymphoid cell with a weakly staining round nucleus and a clear ungranulated protoplasm; fifth, a myelocyte showing neutrophile granulations; sixth, a polymorphonuclear leukocyte. Eosinophile cells go through the same process of development, with the single difference that the granules in their protoplasm are from the beginning coarser, and soon show the characteristic staining reaction instead of being neutrophile. [The leaning of those who are active in investigations concerning the source of the leukocytes is in a general way in consonance with Rubinstein's view that the lymphocytes are derived from lymphatic tissue while the polymorphonuclear neutrophiles, the transitional forms, and the eosinophiles have their origin in the nonlymphatic marrow. The source of the large mononuclear cells is much more questionable.]

II. Marcus¹ states that **normal fresh leukocytes are stained by neutral red**, while degenerated leukocytes are not.

Auché and Vaillant² direct attention to the fact that, contrary to the older teaching, **leukocytosis is not always present in cancer**. They describe 2 cases of carcinoma in which there was a decided leukocytosis, and another case of rodent ulcer of the face of 7 years' duration, in which the leukocytes were only about 6000. They also report a case of abdominal tumor with leukocytosis, and decide from this sign that

¹ Wien. klin. Woch., Sept. 27, 1900.

² Jour. de Méd. de Bordeaux, Feb. 10, 1901.

the tumor was probably cancerous. [This contribution was scarcely needed to convince one of the truth of the main statement. It is established beyond any doubt that leukocytosis is not a constant symptom of carcinoma and cannot be firmly depended upon in diagnosis.]

C. Tarchetti¹ has made some studies of the **nature and significance of the iodophile granulès** in the white blood-corpuscles. Contrary to the statement of Czerny, he considers that the substance is closely related to or identical with glycogen, and is not the product of amyloid change; he was unable to get a violet or blue reaction with iodine and sulphuric acid. He confirmed the observations of Gabritschewsky and Liverieto that the injection of carbohydrates and peptones results in the production of a marked iodophile reaction in the blood, and believes with them that this indicates that the leukocytes absorb the peptone and sugar and produce glycogen from them. He does not consider that Kaminer is right in believing that the iodophile substance is a degeneration product. He finds the reaction marked whenever there is any decided degree of acute leukocytosis.

A. Wolff² discusses the **occurrence and importance of eosinophilia**. In normal persons he found the average number to be from 1.5% to 2.5%; numbers reaching above 6%, or at any rate 8%, are pathologic. Contrary to the experience of other investigators, he found no difference between children and adults in regard to the number of eosinophiles. He emphasizes the fact that the literature contains most contradictory reports concerning the presence of eosinophilia in a large number of conditions in which it is said to be a symptom; for instance, he was unable to demonstrate any increase in psoriasis. He, however, considers eosinophilia a practically constant element of the pathologic anatomy of **bronchial asthma**. He reports a case in which he investigated the blood frequently for 12 months and always found values above 10%, even in a period of 6 months in which the patient was free from asthma. He considers this evidence that there was some constitutional anomaly in this case. In 2 cases of hay asthma also he found increase of the eosinophiles. In **helminthiasis**, in which many authors have suspected eosinophilia, he found that this was by no means constant, and the same is true of gonorrhea, in fresh or old cases. Wolff reaches the conclusion that the diagnostic value of eosinophilia is, according to our present knowledge, not specially great, and that the existence of eosinophilia should only raise the question whether bronchial asthma is present. But the physiologic and pathologic importance of eosinophilia must be considerable, since it is seen with so many diseases, and it must therefore have some definite purpose. [It is unquestionably true that marked eosinophilia is not a sign of any one condition, and that it may, like other symptoms, be absent in the conditions in which it usually occurs. It nevertheless remains true in regard to parasites, that eosinophilia occurs so frequently and in such marked degree in trichinosis that its presence in marked degree should cause a search for this disease in obscure cases; and in this sense it is a valuable sign.]

¹ Clinica Med. Ital., 1900, No. 8.

² Ziegler's Beitr., Bd. XXVIII, H. 1.

C. Archard and A. Clerc¹ observed a marked **eosinophilia** together with a general scarlatiniform skin eruption **after the use of a small amount of a solution of picric acid** in the treatment of a burn of the elbow. The eosinophilia reached as high as 15%. There is no previous report of a similar observation. Experiments on 2 dogs showed no results in one case after a dose of 60 milligrams, while similar symptoms were temporarily produced in the other dog by 80 milligrams.

METHODS OF EXAMINING THE BLOOD.

Starke's² investigations agree with those showing that the Thoma-Zeiss blood-counting chamber is **influenced by the external atmospheric pressure**, and that the assumption in regard to the increase in blood-corpuscles in high altitudes is not valid. [This factor in technic does not, however, seem sufficient to account for all the changes seen; and there is good evidence that it is not sufficient to explain the difference in the count. Furthermore, there are such decided alterations in general metabolism that one would anticipate changes in the number of the blood-corpuscles.]

A. Dare³ describes a **new hemoglobinometer** for the examination of undiluted blood. The advantages which he claims for the instrument are that it eliminates the technical requirements and possible errors due to dilution, a marked leukocytosis causes no error, the shades of color are very decided, and the variations in hemoglobin are readily determined. The examination requires very little time. The pipets used all contain the standard quantity, and can therefore be used with any instrument. The variations in the estimations made by persons entirely unskilled in such work were rarely over 2%. The instrument consists of a chamber into which the blood is drawn by capillary attraction, and in which it is compared with a graduated colored prism of tinted glass, which represents the amount of hemoglobin in the blood examined. The details of the instrument are given in full.

H. Mallet⁴ believes that the **hematocrit** may be used in determining the number of red blood-corpuscles in normal blood, but in pathologic conditions the changes in the red blood-corpuscles render the results inaccurate. He thinks, however, that if used in connection with a blood-count one may determine with a fair degree of accuracy **the average diameter of the red blood-corpuscles** by the following formula: The number of corpuscles as determined by the hematocrit is to the number as determined by a count as is the average diameter of the corpuscles to the figure 7.5 μ . He thinks that some conclusions as to the nature of an anemia and also as to the regeneration of the red blood-cells may be drawn from such a method. [Conclusions drawn from such a method of examination are, however,

¹ Gaz. Hebdom. de Méd. et de Chir., 1900, No. 81.

² Wien. med. Woch., Oct. 27, 1900.

³ Phila. Med. Jour., Sept. 22, 1900.

⁴ Gaz. Hebdom. de Méd. et de Chir., 1901, No. 5.

subject to such decided and numerous errors that their value would be highly questionable. It is probable that the results by this combined method would be less accurate than those obtained by using the hematocrit alone.]

E. A. V. Willebrand¹ recommends the following **method for combined staining** of the protoplasm, nuclei, and granules of the leukocytes. Take equal parts of a 0.5% solution of eosin in a 70% alcohol solution and of a concentrated watery solution of methylene-blue. Test the staining properties of the liquid until it is found to give a diffuse blue stain. Add a 1% solution of acetic acid, drop by drop, until by testing it on other preparations it is found to give the proper staining results. It will then be found that the red cells take a red stain, the nuclei stain deep blue, the neutrophile granules violet, acidophiles pure red, and the granules of the mast cells deep pure blue.

N. P. Van Spanje,² in determining the **specific gravity** of the blood, recommends the use of a mixture of **chloroform and olive oil** which is easily prepared, does not evaporate so readily as the ordinary chloroform-benzol mixture, and keeps much better than the mixture containing glycerin. Three parts of chloroform with one part of olive oil give a mixture with a specific gravity of about 1056. He insists upon the diagnostic importance of determining the specific gravity.

F. C. Busch, A. T. Kerr, and F. Filsinger³ discuss the **relation of the specific gravity of the blood to its percentage of hemoglobin**. Their conclusions were based upon a study of over 100 cases, using the specific gravity method and the instruments of Fleischl and Gower. They decide that in most cases the specific gravity and the percentage of hemoglobin bear such a relation to each other that the latter may be predicted from the former with sufficient accuracy for clinical purposes. The instruments of Fleischl and Gower are liable to an error of 10% or more, while there is likely to be very little, if any, error in the determination of the specific gravity by Hammerschlag's method.

Waldvogel⁴ recommends that in doing Salkowski's method for the determination of the **alkalinity of the blood** one should use normal sulphuric acid instead of quarter normal, as he has in some cases found quarter normal to be insufficient. He recommends also that when the sulphuric acid remaining unneutralized is to be titrated one should determine exactly the bulk of the solution. He was led into error by taking 5 cc. of the remaining solution and calculating the total acidity from the acidity found in this amount. The error, he discovered, was due to the fact that the amount of fluid had decreased during the days that the Schlösing apparatus had been standing preparatory to the titration. This abstraction of the water was probably the effect of the ammonium sulphate beneath. Hence, if only an aliquot portion of the fluid is taken, one should determine exactly how much fluid there is

¹ Deut. med. Woch., Jan. 24, 1901.

² Nederl. Tijdsch voor Geneeskunde, 1900, p. 107.

³ Buffalo Med. Jour., Oct., 1900.

⁴ Deut. med. Woch., Oct. 25, 1900.

before titrating. The **normal values** which he has found by this method have been from about 360 to 400 milligrams of sodium hydrate in men, and in the neighborhood of 300 in women. He found the values markedly reduced in fever in both sexes, but there was no direct parallelism between the temperatures in the various cases and the alkalinity. The reduction of the alkalinity was found to persist in some cases when the temperature had fallen to normal. All the patients investigated who had fever were subjects of typhoid. In one case of pernicious anemia associated with typhoid fever he found the lowest record. This was a value of 40 milligrams of NaOH. He found a reduction of the alkalinity in a man who had fasted for 60 hours; it was associated with acetonuria. Waldvogel believes that the method may prove to be erroneous, in that in allowing the blood to stand for 5 days the ammonium salt may cause some escape of the alkaline elements from the blood-corpuscles. This is probable, since the values approach those obtained by Loewy by his method. The values are also higher than those obtained by Kraus and von Jakseh. He recommends the method, however, because of its simplicity and striking directness. [The method is certainly not accurate. It is possible that some useful results might be obtained by a large series of estimations by this method or Loewy's, but there is no doubt that the method described by Spiro is more accurate than any other we have, and gives a much more comprehensive result. It is but little more difficult to use than any of the other methods.]

M. Bönninger¹ discusses the **method of determining fat in the human blood and the changes it shows in disease**. The method which he selected as being the most valuable is that recommended by Hoppe-Seyler, which consists in receiving 5 to 30 grams of blood in 20 times its volume of 86% alcohol. After mixing it is allowed to stand for a day or two, filtered, the deposit filtered, treated again in the same way, afterward with ether, then digested thoroughly, and shaken with ether. The extracts so obtained are evaporated to dryness, extracted with ether, dried, and weighed. The filter papers also are extracted in a Soxhlet apparatus, as they retain considerable fat. The amount obtained in this was added to the other. The amount in normal blood varied from 0.75% to 0.85%. The fat was found high in diabetes, nephritis, and hysteria (1 case of each); it was found highest in a case of carcinoma of the esophagus (1.4%), and reached nearly 1% in a case of pneumonia. In the first of these cases the author thinks that the increase in fat was due to the inability to take food and consequent partial starvation, and probably to the same cause in the case of pneumonia. The serum was found to contain neutral fat, lecithin, and cholesterin. The latter united with fatty acids, particularly oleic acid. The blood-corpuscles contained cholesterin and lecithin, but no neutral fat.

P. A. E. Richards² describes a method for the **estimation of iron in animal organs**. He first weighs a portion of the organ, dries it, and incinerates it at a low heat; after adding nitric acid it is gently in-

¹ Zeit. f. klin. Med., Bd. XLII, H. 1 u. 2.

² Lancet, Nov. 24, 1900.

cinerated again. This process is repeated, hydrochloric acid is added, and it is then warmed and transferred to a beaker; strong nitric acid is added and it is boiled. It is then diluted and filtered; a measured quantity of the filtrate is taken, 1 cc. of potassium ferrocyanid added to the mixture, and diluted to 50 cc. The color reaction is compared to that obtained with standard iron solution. The percentage of iron in the dry residue of the organ is, as usual, calculated by first driving off the moisture and then weighing the portion taken and calculating the iron according to this weight.

W. H. Birchmore¹ believes that by proper staining and sufficiently careful methods **the blood of different individuals may be differentiated**, and that examination of the specimens of stained blood will determine in many instances whether they are from the same individual or another specimen. [Any attempt to differentiate the blood of different persons, or even species, by means of staining reactions, at any rate by means of those now known, will certainly result in failure.]

Uhlenhuth² claims that he has devised a **method differentiating different species of blood**. Injection of rabbits with defibrinated cows' blood was carried out at intervals of about a week, using 10 cc. at each injection. After this time he found that if a clear solution of cows' blood was made in about 100 parts of water, any precipitate being filtered off, and this solution diluted with an equal part of 1.6% salt solution, a reaction would occur if blood-serum of the injected rabbit was added to the solution, the fluid becoming cloudy. This occurred only with cows' blood, and not with blood of a large series of other animals nor with human blood. When the rabbit whose serum was finally used in the test was injected with another form of blood, the test proved to be specific for this form of blood alone. This was quite as true of human blood as of blood from lower animals, and Uhlenhuth also states that blood that had been dried for weeks and afterward dissolved in physiologic salt solution gave the reaction perfectly. He thinks that the **reaction is a specific one, and may be used in medicolegal work and for other purposes**. It is important to dilute with salt solution, as the serum will become cloudy in any case if plain water is added.

A. Wassermann and A. A. Schütze³ report their results concerning the differentiation of human blood from that of other species, and confirm previously published reports. They found, as did Uhlenhuth, that injection into rabbits of human blood-serum resulted in the production of some substance in the blood of the rabbits which caused precipitation when added to a solution of human blood, but had no effect upon other species of blood. They admit that the reaction is **not absolutely specific** for human blood, in that it may occur with the blood of apes; but with this exception they consider it wholly specific, and they think that if a reaction is obtained and there is no possibility that the blood could be monkeys' blood, it may be definitely stated, even for medicolegal

¹ N. Y. Med. Jour., July 7, 1900.

² Dent. med. Woch., Feb. 7, 1901.

³ Berlin. klin. Woch., Feb. 18, 1901.

purposes, that the blood is human. They found that the reaction occurred in dried blood as long as 3 months after it had been drawn, and that under such conditions also the reaction was entirely specific.

R. Stern¹ states that the results of Uhlenhuth are not new, and that this author has not given sufficient recognition to previous workers. He particularly directs attention to the work that has been done by Bordet, and states that he has had results similar to those of Uhlenhuth, working without knowledge of the investigations of Uhlenhuth. He considers that the reaction is not, strictly speaking, specific, for he obtained a reaction with both human serum and the serum of apes with the same antiserum; he also notes that Bordet found in his work that the serum of a rabbit which had been injected with hens' blood would react to doves' serum as well as to chickens' serum. He therefore considers it probable that there is a decided possibility of error in the use of this method of differentiation of various species of blood, and that it is certainly not as yet suited to medicolegal work. The reaction is, however, an extremely delicate one. He found that he could increase the activity of the serum of the animals injected so largely that he **obtained a reaction with a dilution** of the serum of the original animal **as great as 1 to 50,000**.

Uhlenhuth² also contributes an interesting article on the possibility of the **specific demonstration of the presence of egg-albumen by a similar serum test**. His results were as follows: Repeated ingestion or intraperitoneal injection of a solution of hens' egg-albumen caused in rabbits the production in the blood-serum of some substances which caused a cloudiness or precipitate in the solution of egg-albumen when the serum was added to a solution of hens' egg-albumen. The serum from the rabbits caused the same phenomenon in a solution of albumen of the pigeon's egg, and rabbits treated with pigeons' egg-albumen produced the same phenomenon in solutions of pigeons' egg-albumen or hens' egg-albumen. The reaction, however, was observed only with solutions of egg-albumen and not with numerous other forms of albumin which were tested. The serum could be heated to 60° for over an hour without any influence upon the reaction. This method for the demonstration of albumen was found to be far more delicate than any chemie reactions. It demonstrated the presence of albumin in solutions as weak as 1:100,000.

A. E. Wright³ reports a **method of measuring the bactericidal power of the blood** for clinical and experimental purposes. He mixes, in capillary tubes, measured quantities of blood-serum, in various dilutions, with a culture of the microorganism to be tested. Indifferent fluids are then mixed with the same amount of the culture in other tubes, and the two sets of tubes are incubated for a day or two. The tubes are then examined by the microscope, being placed between two glass slides that have been filled with Canada balsam or cedar oil. It was found that in normal blood a two-fold dilution was sufficient to kill the bacilli in

¹ Deut. med. Woch., Feb. 28, 1901.

² Deut. med. Woch., Nov. 15, 1900.

³ Lancet, Dec. 1, 1900.

50 instances, and in 22 cases a ten-fold dilution was bactericidal. The bactericidal action was complete in a forty-fold dilution in 15% of the instances. The addition of antityphoid serum to the normal blood caused almost complete loss of the bactericidal power. The blood rapidly diminished in bactericidal power after withdrawal. The capillary tubes are made as usual, and are graduated by filling with known quantities of some colored fluid marking the point to which the different quantities of the fluid reach in each tube.

Hirsch and Beck¹ describe a method of determining the **internal friction resistance of the human blood**. The method is practically that of Hürthle, and consists in the use of a capillary tube of known size, the blood being forced through this by constant pressure, and the viscosity being measured by the amount of time required for the blood to pass, the result being obtained by means of a formula which compares the viscosity with that of water at the same temperature. They found the time required by the blood of normal individuals to pass the tube to vary only within about one-fifth of a second, while in various pathologic conditions the variations were between 26 and 82 seconds. A more extended communication will discuss their results more thoroughly.

E. Hürthle² describes a method for the determination of the **viscosity of living blood**. Previous methods have been carried out with defibrinated blood, or with blood that has been laked with oxalates. Results obtained by these methods are therefore not satisfactory for showing the condition in living blood.

R. Burton-Opitz³ details the **results** which were **obtained in using Hürthle's method**. The influence of narcosis upon the viscosity of the blood was slight and of no importance. The viscosity was reduced by abstraction of blood. As to the influence of food, he stated that in dogs it was most marked after the use of meat; next, after the use of fats; and next to these, after the use of carbohydrates. It was least in hunger. It was always less in rabbits than in dogs, and in these animals was not most reduced in hunger, but after the use of very watery food. It was in rabbits, as in dogs, most marked after the use of food which contained much albumin. The viscosity of the total blood was not always parallel to that of the serum. The viscosity of defibrinated blood decreased with increase of temperature.

CHLOROSIS.

R. Wybauw,⁴ in discussing the **cardiac dullness in chlorosis**, states that the increase is sometimes due to actual dilation, sometimes to upward displacement of the heart by pressure of the diaphragm. A distinction is made by observing that when there is only displacement the apex beat is pushed outward and upward; when dilation is present, the apex beat is dislocated downward and outward.

¹ Münch. med. Woch., Dec. 4, 1900.

² Pflüger's Arch., Bd. LXXXII, S. 415.

³ Pflüger's Arch., Bd. LXXXII, S. 447 u. 464.

⁴ Lancet, Oct. 6, 1900.

Engelhart¹ describes a case of chlorosis in a girl of 18, in which a **diagnosis of tumor of the brain was made during life** because of bilateral optic atrophy and choked disc. Death occurred, and autopsy showed no alteration in the brain, excepting marked anemia. Engelhart believes that the optic neuritis, and the general symptoms which had given rise to the diagnosis of brain tumor, had been the result of the chlorosis; there were also present in the case during life hemiplegia, hemianesthesia, general convulsions, and anomalies of the reflexes; but these he attributes to coincident hysteria.

E. F. M. Neave² describes a case of chlorosis in which he made a diagnosis of **thrombosis of the cerebral veins**. The patient was a married woman of 31, who had most of the usual symptoms of chlorosis. She had repeated attacks of syncope, vomiting, severe headache, and numbness in the left arm and leg; there was marked pain in the frontal and vertebral regions of the skull, the patient was somewhat delirious, and her memory was disturbed. She made a successful recovery.

Treatment.—Senator,³ in discussing the nature and treatment of the anemias, first states that it is probable that the cases included under the name of primary or essential anemias will be continually reduced in number. One must always, to make this diagnosis secure, assure himself of the absence of intestinal or blood parasites, investigate the motor and chemic functions of the stomach, and consider the possibility of malignant tumors of the stomach and bone marrow. Senator classes as essential anemias chlorosis, progressive pernicious anemia, and mountain sickness. Chlorosis is retained within this class only because we do not yet know the actual primary cause of the disease. As to the treatment of chlorosis, Senator finds **iron practically specific**. He prefers the organic iron salts, such as the lactate and acetate and the citrate, since they cause little disturbance of the stomach. When gastritis is present, the use of alkaline muriatic waters and hydrochloric acid causes better results than iron; after this the saline chalybeates may be used. If the patient is at home, pyrophosphate of iron water may be readily used. Baths, such as hot water, sand, and hot-air baths, have a useful effect upon metabolism. Senator does not recommend bleeding. In the diagnosis of pernicious anemias Senator lays especial stress on the movability of the megalocytes in blood preparations, and on pain on pressure over the sternum. He finds albuminuria common in pernicious anemia. Arsenic and quinin constitute the best medication.

Fölkel⁴ has made a study of **fersan**, an acid-albumin which is said to contain the total iron and phosphorus of the erythrocytes in organic combination. He states that the use of this substance caused a very rapid increase of hemoglobin and erythrocytes, and an increase in weight. The effects he found are largely attributable to the amount of phosphorus contained in the drug. It caused no disturbance of the stomach, but rather increased the appetite. He believes that the sub-

¹ Münch. med. Woch., 1900, No. 36.

² Lancet, July 28, 1900.

³ Berlin. klin. Woch., 1900, No. 30.

⁴ Münch. med. Woch., 1900, No. 44.

stance is not only a useful form of iron and phosphor, but is also a nutriment because of the albumin contained in it.

F. Winkler¹ administered concentrated solutions of **fersan** to mice and guinea-pigs, and killed the animals afterward, determining the amount of iron contained in the various organs. His constant result was to find that the iron of the fersan appeared to have been well absorbed, and to be present in the liver and spleen as inorganic iron. He thinks, therefore, that it is **a useful preparation of iron**.

Kormanth² states that **fersan** is obtained by the action of HCl upon red blood-cells isolated by centrifugation, the albuminous body separating and carrying with it iron and phosphorus in organic form, and the albumin being found as acid-albumin. It is said to contain 90 % of soluble albumin, and to be readily absorbed, and to answer the metabolic needs of the organism. He believes that it rapidly increases the hemoglobin, both in animal experiments and in human disease, and at the same time the appetite and body weight increase. He observed the absence of any disturbance of the stomach or intestine, or any unfavorable effect upon the appetite even after its prolonged use.

Menzer³ carried out investigations of the **metabolism while fersan was being used**. When given in doses as large as 40 grams a day the albumin of this preparation appeared quite as useful as the albumin of milk or meat. It is also well borne and well absorbed, and is therefore considered a good nutritive preparation. He recommends it in cases in which it is desired to improve coincidentally the condition of the blood and of the general nutrition.

A. Gilbert and P. Lereboullet⁴ insist upon the value of the **cacodylate of iron**, which they claim is but slightly poisonous in extremely large doses, and can be used either subcutaneously or by the mouth. They believe that it does not cause irritation of the kidneys, and can be used with good results even in cases of marked anemia with Bright's disease, the anemia improving and the albuminuria becoming less. It is easily soluble, and can readily be given by the mouth in watery solution. It is said not to disturb the stomach. They recommend it in the various forms of anemias in which it is desired to increase both the number of red blood-cells and the hemoglobin.

Schürmayer,⁵ after 5 years of extensive use of the different **iron preparations**, advises iron in uncomplicated anemia, amenorrhea, rachitis, the first stage of tuberculosis, and chlorosis. He prefers Liq. ferr. mang. peptonat. (Dietrich-Helfenbug).

PERNICIOUS ANEMIA.

Etiology and Pathology.—Stengel⁶ considers the question of the etiology, the pathology, and the diagnosis of progressive pernicious

¹ Therap. der Gegenwart, Oct., 1900.

² Zeit. f. diätet. u. physiol. Therap., Bd. IV, No. 6.

³ Therap. der Gegenwart, 1900, No. 2.

⁴ Gaz. Hebdom. de Méd. et de Chir., 1900, No. 64.

⁵ Wien. med. Woch., Oct. 27, 1900.

⁶ Med. News, Oct. 20, 1900.

anemia. He says that Ehrlich's view, that there is a distinctive form of activity in the marrow in pernicious anemia, to which he would give the term megaloblastic, and that this does not occur in other forms of anemia or cachexia, rests upon no scientific demonstration excepting that a certain form of nucleated red cell is common in pernicious anemia, and rare in other forms of anemia or cachexia. Stengel considers the trouble **not as a disease sui generis, but as a secondary condition**, due to hemolytic agents arising from the gastrointestinal tract. The presence of such toxic agents is explained by the discovery in some cases of *Bothriocephalus latus*, or other parasites, or of atrophy of the gastric mucosa, ulcerations or cancer. Besides this, the author inclines to the belief that "the hemogenetic function of the bone marrow in certain persons is deficient or perverted," because of certain rather theoretic considerations, and because "the character of the blood in pernicious anemia suggests a profound disturbance of hemogenesis." The number of red corpuscles and the percentage of hemoglobin, as well as a morphologic study of the cells, are essential factors in a certain diagnosis. Stengel thinks that there are very few cases, if any, of conditions other than pernicious anemia in which the number of corpuscles is below 1,500,000 and the hemoglobin excessive or even approximately equal in percentage to that of the corpuscles. "Poikilocytosis reaches its highest grades in pernicious anemia. Macrocytes and an average excess in size of the red corpuscles are more common in this than in any other disease; polychromatophilia and macrocytosis are more striking in this disease than in any other; megaloblasts are more abundant and more regularly present in pernicious anemia than in other forms of anemia; and a combination of all these factors practically assures the diagnosis." Stengel has seen 2 cases of leukemia, during a period of aleukocytosis, and several other cases of profound anemia in childhood, which would have been diagnosed pernicious anemia if Ehrlich's statement, that "the positive demonstration of undoubted (unzweifelhaft) megaloblasts in combination with the presence in abundance (reichlicherem Auftreten) of macrocytes is indicative of pernicious anemia, since these conditions proclaim without question that the embryonal type of blood-formation has superseded the adult variety, even if but limited areas of the marrow are so affected," had been dogmatically regarded. Since the normoblasts outnumbered the megaloblasts in several of Stengel's cases, even when the size and morphologic properties of the nucleus were regarded in deciding which cells were megaloblasts and which were not, according to Ehrlich's method, he thinks it unwarranted to consider a preponderance of large red cells, and the predominance of megaloblasts, when there are both normoblasts and megaloblasts, necessary conditions to establish the diagnosis of pernicious anemia. Upon the observation of the train of characteristic clinical manifestations, together with the results of special laboratory investigations, should rest the final diagnosis. "The prognosis *quoad vitam* is hopeless; the outlook *quoad valetudinem* is often quite hopeful."

G. Jawein¹ reports a case of **progressive pernicious anemia caused by *Bothriocephalus latus***. He decides that the disease caused by this parasite is an anemia which, except for the etiology, shows absolutely no distinction from so-called idiopathic progressive pernicious anemia. He thinks, therefore, that there is no reason for putting the cases caused by *Bothriocephalus* in a separate category. The anemias produced by this tapeworm are due, he believes, to the absorption from the intestinal canal of some poison or poisons produced by the parasite. These have their chief influence upon the bone marrow and cause perversion of its function or interfere with its function. He considers that enlargement of the spleen does not occur in progressive pernicious anemia. [Most clinicians, however, agree in the statement that slight or even distinct splenic enlargement is not uncommon.]

E. Becker² describes a case of pernicious anemia in which 2 *Tæniæ saginatae* were found in the intestine. This parasite is found so frequently that any relation between its presence in this case and the pernicious anemia seemed improbable at first. There was, however, a good deal of gastrointestinal disturbance, and Becker considers it probable that the parasite set up the gastrointestinal disturbance and caused a secondary anemia. He reports another case of pernicious anemia in which shortly before death the blood-count fell to 284,000. He also describes a case of severe secondary anemia in which the red cells decreased to as low as 680,000, and the hemoglobin to 18%. The autopsy showed that this was a case of tuberculosis of the intestines and mesenteric glands, with ulcer of the stomach. The large tubercular masses were thought to have pressed upon the large lymph-vessels and to have hindered the movements of the chyle, and thus to have produced anemia. A case of posthemorrhagic anemia showed a reduction of the red cells to 800,000 and of the leukocytes to 17,000, the presence of myelocytes, 32 nucleated red cells to 250 leukocytes, and some megaloblasts. [This blood picture is said to be exactly that of leukemia. The leukocytosis is spoken of as "colossal," but the figures given are 17,000. This is possibly a printer's error.] In lead colic he has found the basophile granules described by Grawitz. There was a leukocytosis in one case of lead-poisoning of 19,000, the polymorphonuclears being chiefly increased. There were also nucleated red cells. The leukocytes and nucleated red cells were attributed to bone marrow irritation resulting from the anemia.

C. L. Dana³ reports a case of pernicious anemia in a man of 47, of German birth. He especially directs attention to the history that this patient was the thirteenth of 14 children, all the others, with one exception, having been born dead, and the other child had ultimately died of pneumonia. This, he believes, indicates that there was in this generation an extreme lack of vitality, since there was no history of syphilis obtainable. He refers to other diseases in which there is evidence of weakness of certain tissues, as, for instance, muscular dystrophies, in which the muscular system is congenitally short-lived, hereditary chorea,

¹ Bolnit. Gaz. Botkina, No. 30.

² Deut. med. Woch., Sept. 6, 1900.

³ Med. Rec., Dec. 1, 1900.

in which the gray matter of the brain dies early, and some forms of primary dementia, and also tabes dorsalis, and other degenerative diseases in which there is evidence that the special tissues affected have an abnormal lack of vitality, since they and they alone are influenced by the cause of the disease. He **believes that pernicious anemia, while a disease of hemolysis, is primarily one of hematogenesis** in that the cells are imperfectly developed and have low vitality and consequently are readily destroyed by any hemolytic agent. He considers the theories of specific infection and of autointoxication to be unconvincing and to have little actual support. He finds no serious mention of a **lack of family vitality** in discussions on pernicious anemia, and considers that there should be more careful study of such a possibility in investigating these cases. The case reported presented the usual characteristics of advanced pernicious anemia, the red cells falling as low as 958,000, the hemoglobin to 23 % ; the white cells showed marked alterations in form and size ; degeneration areas were present ; there was polychromatophilia, and normoblasts and gigantoblasts were seen. [The author dismisses the theories of toxemia of various kinds with too little consideration. The lack of distinct family tendency to pernicious anemia, and of any distinct tendency of the disease to appear at any special period of life, particularly youth, suffice to render the preponderating importance of faulty hemogenesis improbable. We are disposed to believe that the blood organs are at times poorly developed and readily crippled, as we admit the same of other organs ; but this does not in itself bring us much nearer the actual etiology of the disease.]

O. Schumann ¹ discusses pernicious anemia in the light of the modern hypothesis of a toxemia. He considers that the disease is **best explained as the result of some toxic action**. There is no doubt that what is clinically pernicious anemia is due to a variety of causes, but he classes as pernicious anemia both those forms of the affection which show a definite relation to some organic changes and those which show no discoverable etiology. The clinical picture described by Biermer and Ehrlich should be followed in making a diagnosis, rather than the pathologic conditions discovered. He notes that the administration of various poisons to animals has produced conditions very similar to pernicious anemia ; even the administration of freshly compressed *Bothrioccephalus* has produced in dogs the blood-changes of pernicious anemia. Strong testimony of the toxic origin of the disease is also found in the relation of gastrointestinal disturbances, and particularly in the improvement seen in some instances after treatment of the alimentary tract. The cases occurring in pregnancy also, which are so likely to be associated with vomiting, nephritis, and eclampsia, seem almost certainly to be toxic. There is no doubt, however, that whatever the cause, there is a definite personal predisposition to the disease. The poison exerts its influence in two ways—in destroying the circulating blood-corpuscles and in acting as an excitant to the bone-marrow, and the severity of the

¹ Sammlung klin. Vorträge, N. F., No. 287.

disease depends upon the greater activity of the one or the other of these two influences. The excessive destruction of the protein tissues and the peculiar changes in the spinal cord seem to Schumann to be further testimony of the toxic origin of the disease. That the action of the toxic material or materials is a special one is, however, seen in the relatively marked reduction of the blood-corpuscles as compared with the hemoglobin, conditions which are contrary to those seen, for instance, in tuberculosis and malaria, in which the blood-changes are certainly toxic, but are the result of the action of a toxin which has a different influence. Schumann does not consider megaloblasts to be distinctive of the disease from a diagnostic standpoint, nor to be of great prognostic importance. He does not consider them to be wholly different from normoblasts; they are rather abnormally developed nucleated cells, and may appear in other conditions than pernicious anemia.

A. E. Barber and W. Hunter¹ report a case of **pernicious anemia following traumatic stricture** of the small intestine. The patient, a man of 28, had been run over 7 years before by a wagon. This injury produced a prolonged illness, and afterward the patient was weak and anemic and had attacks of pain and vomiting, which were prolonged and frequent. The red blood-cells became reduced to as low as 1,000,000, and the hemoglobin to 20%. The red cells varied much in size. No nucleated cells were seen. The bowel was believed to be strictured, and the operation showed slight stricture of the small intestine. The patient died after operation. An autopsy showed the stricture to be the result of cicatrization of an ulcer, which had apparently been produced by crushing the bowel against the vertebral column at the time of the accident. There was also suppuration in the ethmoidal cells, the teeth were decayed, and there were pus sacs at the roots of many of them. The liver and kidneys showed marked excess of iron.

Symptomatology.—R. C. Cabot,² in a study of 110 cases of **pernicious anemia**, states that in 27 cases the red cells varied from 500,000 to 1,000,000; in 45 cases, from the latter point up to 1,500,000; and in 34 cases, from 1,500,000 up to 2,000,000. The leukocytes were below 1000 in 9 cases, below 3000 in 23 further cases, and below 5000 in 40 further cases, and in 14 cases they were between 7000 and 13,000. The hemoglobin was relatively high in 79 cases. The average diameter of the red cells at the final examination was increased in 89 cases. Megaloblasts were present in large numbers at the final examination in 87 cases. The lymphocytes were found to be below 30% in 34 cases; they were between 30% and 60% in 67 cases, and between 60% and 90% in 9 cases. Eosinophiles were over 4% in only 13 cases, and in 7 cases none were found. Myelocytes were present in 66 cases; they were above 7% in only 7 cases, and reached 10% in but 2 cases. The greater number of the cases die within 2 years from the appearance of the earliest symptoms. Cabot considers the prognosis to be invariably bad, and thinks that many of the remissions in symptoms attributed to the use of arsenic are actually the result

¹ Lancet, July 21, 1900.

² Am. Jour. Med. Sci., Aug., 1900.

of the tendency that the disease itself shows to remissions. In remissions the hemoglobin is likely to be relatively low; there is likely to be a moderate leukocytosis, chiefly of the polymorphonuclear type, and the myelocytes are likely to disappear, while the number of megaloblasts decreases, and even the normoblasts which take their place may disappear. The varied diameter of the red cells is sometimes even greater during remissions than at other times. The diagnosis from symptomatic anemia is frequently extremely difficult during remissions.

Billings¹ reports most fully, with **detailed tables of the blood findings, 20 cases of pernicious anemia.** Some of his conclusions are here quoted. "No exciting cause could be found in any case." "The hemoglobin varied from 15% to 74% (Fleischl) and the red corpuscles from 156,000 to 4,000,000. The color index in 53 of 66 observations was above normal. The lowest was 0.66, the highest 8.9 (?). Four cases showed the color index either constantly or usually low. In 8 cases the low color index occurred at some time during the disease." "The leukocytes on the average were below normal." "A differential count of stained specimens showed an average of 29.5% of mononuclear cells, which is about normal; . . . and a diminution in the number of polymorphonuclear neutrophils, both relative and absolute." "The myelocytes were most abundant, broadly speaking, when the patient was low, but they appeared to be of little diagnostic or prognostic importance. These cases seem to show that the nucleated red cells are an essential feature of the disease. The actual number was sometimes very large,—in one case 10,336 per cubic millimeter,—but more often it was small." "The quality of the nucleated red cells seems of greater significance than the number. The regenerative forms or normoblasts are of little consequence, but the degenerative forms or megaloblasts are very characteristic. In many cases they were present, and in fact the diagnosis could not well be made in their absence." The proportion of megaloblasts usually gained a numerical ascendancy over the normoblasts when the disease was advanced. "Poikilocytosis was present in all cases, and in no case did it entirely disappear at any stage of the disease, including the period of greatest improvement. Polychromatophilia was present at some time in all of the cases, but was not a constant factor during the course of the disease, and especially during the stage of improvement."

F. P. Henry² publishes some **clinical notes on pernicious anemia.** Three of the five cases reported came to autopsy. Among the interesting points, reference is made to the following: In 1 case there was paralysis of the extensors of the hands and feet, evidently due to peripheral neuritis; but whether this was toxic and caused by arsenic or not seems to him questionable. The author states that peripheral neuritis should be more common if it is due to the arsenic, as this drug is so frequently given in large doses. Enough susceptibility, however, might govern the matter. In the same case in which peripheral neuritis occurred there was also bronzing of the skin, which he states may

¹ Am. Jour. Med. Sci., Nov., 1900.

² Am. Jour. Med. Sci., Aug., 1900.

have been due to the arsenic. Incidentally he refers to another case in which the entire surface of the body was covered with spots resembling freckles, though the skin was not bronzed. His second case exhibited a very curious phenomenon. Ten days after transfusion of blood from an epileptic he developed convulsions. The duration of time seems to include the usual circulatory disturbances which transfusion is likely to cause. Two of the cases were complicated with erysipelas, which the author regards as a frequent condition. Referring to the diagnosis, all of the five cases presented the characters usually met with in the blood—viz., reduction of the number of corpuscles, a relatively high percentage of hemoglobin. The morphologic changes in the blood, from a practical standpoint, seem to him of subordinate importance. According to his experience, there is no disease excepting pernicious anemia in which the red corpuscles are reduced below 20% of the normal—that is, below 1,000,000 per cubic millimeter. Latent gastric cancer, which is most likely to be mistaken, differs widely in the characters of the blood. The corpuscles were rarely excessively reduced, and he has never seen a case with reduction below 1,500,000. He does not deny the possibility of reduction of the corpuscles to 40% or 30% of the normal, though he has never seen such reduction. Among other important characteristics of the blood in pernicious anemia he notes the occurrence of many corpuscles of large size, a considerable number as large as the corpuscles in a lizard or eel, and the frequent occurrence of oval outlines suggests the corpuscles of cold-blooded animals, and in addition nucleated corpuscles further carrying out this suggestive resemblance. [That a blood-count cannot be depended upon in the final differentiation from cancer of stomach is shown by the cases of Frese, discussed further on in this article, and is also demonstrated by a number of other cases of similar character which have recently been reported. It is true, however, that a very low blood-count (below 1,500,000 red cells) is usually indicative of pernicious anemia.]

Le Roy¹ reports a case of progressive pernicious anemia with a count of 620,000 red blood-cells. Puerperal complications, unmanageable diarrhea, and pulmonary tuberculosis were held accountable for this impoverished condition of the blood. The slight parenchymatous nephritis found on section was too recent to make it a causal factor. The injection of saline solution raised the number of red blood-cells from 620,000 to 1,500,000 in 18 days. The author would class progressive pernicious anemia in two divisions: in one, the anemias caused by intoxication of the blood—i. e., by nephritis; in the other, the anemias due to physiologic lack of blood.

L. M. Van Meter² reports a case of progressive pernicious anemia which was interesting because of the **high degree of anemia** which was present. The case had been of somewhat rapid development, the first symptoms having come on 8 weeks before admission to the hospital. It was noted that the man's teeth were in extremely bad condition,

¹ Gaz. Hebdom. de Méd. et de Chir., July 19, 1900.

² Phila. Med. Jour., Oct. 27, 1900.

which is of interest in connection with the statements of Hunter concerning infection through caries of the teeth. The blood-examination at first showed 880,000 red cells and 15% of hemoglobin. The red blood-cells afterward were found reduced to 390,000, the whites to 2000, while the hemoglobin was 14%. There was an increase in the small lymphocytes; 4% of myelocytes were found, and there were fairly numerous normoblasts and megaloblasts. The red cells were afterward found increased to 896,000, and the patient was improving when the report was made.

O. Frese¹ reports 2 cases, one in a man of 26, the other in a woman of 28, in both of which there was **gastric carcinoma** with widespread metastasis to the bones and myeloid change in the spleen, and in which there was a most severe grade of anemia, which clinically **closely resembled pernicious anemia**. In the first case the blood-count on the 16th of April showed 45% hemoglobin, 2,400,000 reds, 8740 whites; 5 weeks later, 9 weeks after the beginning of the illness, the hemoglobin was reduced to 13%, **the count of the red cells was 800,000**, that of the whites 20,000. Death occurred 2 days after the last count. In this case the autopsy showed a pyloric carcinoma with widespread carcinoma of the glands and of the marrow of numerous bones. In the second case the blood was found at the first examination to give the following results; 21% of hemoglobin, 900,000 red cells, 9220 whites; 11 days later the hemoglobin was 13%, **the red cells 681,000**, the whites 10,150. Her blood showed 8% of **myelocytes**. The patient died on the following day; she also had a pyloric carcinoma with glandular metastasis and with numerous bone-marrow metastases. In the latter case a gastroenterostomy had been done 4 weeks before she came under Frese's observation. In both cases the most notable symptoms were those of pernicious anemia, and the gastric symptoms were comparatively slight. Marked fever was observed in both cases, and was particularly striking in the first case. The course of the cases was extremely short, 9 months in one and only 9 weeks in the other, after the first observation of distinct symptoms. Two similar cases are referred to, one of them a carcinoma of the prostate with bone metastasis, another of mammary carcinoma with bone metastasis, both of which had an extremely short course, and presented symptoms similar to those described. In these cases, and in those described by Frese, the bone marrow not involved by metastasis showed marked lymphoid change. Other cases resembling these are referred to.

Pane² discusses **progressive fatal anemia without nucleated red blood-corpuscles** in the circulation, an instance of which he has previously described, and refers to the fact that similar cases have been reported by Ehrlich and Lazarus and also by Engel. Pane found virulent staphylococci in the heart blood of his patient. These were possibly the cause of the affection. He believes the disease is probably of bacterial origin, and that it constitutes a special form of progressive fatal anemia.

¹ Deut. Arch. f. klin. Med., Bd. LXVIII, No. 3 u. 4.

² La Riforma Med., 1900, No. 263.

LEUKEMIA.

Boinet¹ reports 3 cases of leukemia which **point to an infectious origin**. In 2 cases there was a general glandular enlargement, and in 1 case bacteria were found on section of the glands. Enlargement of the spleen was present.

Dennig² reports a case of **acute leukemia** which occurred in a girl of 19, who was thought at first to have chlorosis because of her marked pallor and very low hemoglobin percentage. There was no enlargement of the spleen or lymph-glands, and there was no hemorrhagic diathesis. Shortly before death there were hemorrhages in the choroid and in the gums, and at the end a hemorrhage from the intestines. The diagnosis of acute leukemia was made from the occurrence of leukocytosis and from the very rapidly increasing prostration. The autopsy showed no macroscopic change in the spleen, lymph-glands, or bone-marrow, and microscopic examination of the marrow showed reduced numbers of red corpuscles and polymorphonuclear cells, with a marked increase in the lymphocytes.

Samman³ reports an unusually **rapid case of acute leukemia**, death occurring 11 days after the onset of the disease. The patient, a boy of 19, was taken suddenly ill with general weakness and widespread swelling of the lymph-glands, particularly involving those of the neck, axilla, and inguinal regions; he also had hemorrhage from the nose and enlargement of the liver and spleen. It was **suspected that the case was one of bubonic plague**, but the blood-examination and the further course of the disease indicated the proper diagnosis. [That these cases are much more frequent than has been thought until very recently cannot be doubted, and the possibility of error in diagnosis in the early stages is exceedingly great; while the fact that the cases pursue so rapid a course to a fatal termination makes the diagnosis unusually important in the establishment of a prognosis. We have recently seen a case which had an appearance strongly suggesting diphtheria, but negative results of cultures and the discovery of a leukocytosis of over 460,000 at once led to the proper diagnosis.]

E. J. Brown⁴ reports **2 cases of leukemia**. The first was interesting because of the observation of the patient during the course of pregnancy. Abortion occurred at the sixth month, and was followed by double **phlegmasia alba dolens**. It was unfortunate that the patient was not seen before the occurrence of this complication as well as after it. It is noted, however, that the leukocytes, when counted at the time of the phlegmasia, numbered 250,000 to the cubic millimeter, and there were 38.5% of myelocytes and numerous nucleated red cells. There was a marked hemorrhagic tendency in this case. The patient had had recurring epistaxis, hemorrhage from the bowels, and metrorrhagia. She had pigmentation of the skin resembling Addison's disease. [When first seen it was more than 2 months after the occurrence of the mis-

¹ Wien. med. Woch., Nov. 3, 1900.

² Münch. med. Woch., 1901, No. 4.

³ Brit. Med. Jour., Feb. 23, 1901.

⁴ Phila. Med. Jour., Jan. 12, 1901.

carriage and the beginning of the phlegmasia, and she had but slight fever; it is possible, therefore, that the effect of the complication may have passed off entirely.] She improved markedly under the use of arsenic. The second case of leukemia was notable chiefly because of the occurrence of **uncontrollable priapism**, which lasted for 26 days, and which afterward recurred repeatedly in less marked degree. The case ended fatally within a few months. This man also had marked hemorrhagic tendency, nearly dying at one time from epistaxis. The priapism was not associated with any erethism.

L. Michaelis¹ demonstrated to the Berlin Medical Society a blood preparation from a case of myelogenous leukemia which showed a **peculiar condition of the myelocytes**, the protoplasm showing a bright central spot corresponding to the situation of a centrosome, but a centrosome could not be definitely demonstrated. It was interesting that one could determine the presence of these spots in fresh unfixed myelocytes. The observation of a centrosome in fresh cells is extremely uncommon.

Von Leube² reports a case of severe anemia of extremely rapid course, in which there were leukemic changes in the blood. The patient was a boy of 10, who was noticed early in May to be extremely pale. He afterward had hemorrhages and apathy, followed by loss of consciousness. The spleen and liver were found enlarged; there was a slight amount of albumin in the urine; the red cells were reduced to 256,000; there were numerous nucleated reds—150 megaloblasts and 75 normoblasts to the cubic millimeter; the hemoglobin was reduced to 10%; the white cells numbered 10,500, 14% of these being myelocytes. The child regained consciousness after 2 days, but the temperature fell, and he went into collapse and died 2 days later. The bone marrow was red everywhere, and there were numerous collections of leukocytes in the liver and spleen which resembled small abscesses. Bacteria were not found. Leube classes the case as being **neither pernicious anemia nor leukemia**, but of uncertain nature and probably due to infection. One striking fact was that beside the granulated myelocytes he found numerous myelocytes without granulations, and also polymorphonuclear leukocytes without granulations. This was further evidence that the bone marrow was unable to functionate properly, not only being unable to furnish the proper number of red cells, but also unable to furnish the normal granulations of the white cells.

Arneth³ reports an elaborate study of the blood of the case just discussed. The patient was supposed to be in perfect health and attended school regularly to April 22d. From that date to the 29th he was at home suffering with attacks of vomiting, but was not severely ill. On May 1st he returned to school, but on the 5th was sent to his home by the teacher on account of his pallor. He was admitted to the hospital on the 6th and died on the 9th. During the last 4 days of his life he

¹ Berlin. klin. Woch., Nov. 12, 1900, S. 1040.

² Berlin. klin. Woch., Sept. 17, 1900, S. 851.

³ Dent. Arch. f. klin. Med., Bd. LXIX, No. 3 u. 4.

suffered with repeated nose-bleeding, jaundice, and pains in various parts of the body. When examined he was found to be extremely anemic, with slight edema. The liver and spleen were a little enlarged. There was no muscular soreness, but the shin bones and the sternum were very tender to pressure. The heart was a little enlarged and the rhythm was galloping. The veins of the neck pulsated. There were traces of albumin in the urine, but no albumoses. Ophthalmoscopic examination revealed extreme anemia and a marantic thrombus of the central artery, which had led to numerous scattered hemorrhages. The temperature varied from 39° to 40° C., but just before his death sank to 36.7° C. The heart increased in size and murmurs became audible. Death was the result of gradual weakening. Examination of the blood May 8th showed **256,000 red blood-corpuscles**, hemoglobin 10 %, white corpuscles 10,600. The microscopic examination showed all forms of irregularities of the red corpuscles; polychromatophilic cells were abundant. It seemed that the blood plaques were increased in number, but no count was made. Studying the nucleated red corpuscles, he distinguishes, first, normoblasts; second, certain cells of considerable size (9.7 to 13.0μ) with abnormally small nuclei, sometimes 2 in number and eccentrically placed; these cells corresponding to metrocytes of the second generation, according to Engel; and third, metrocytes of the first generation, which are polychromatic cells of small size resembling the normoblasts except in the staining quality of the protoplasm. The study of the red corpuscles evidenced a pernicious type of disease of the bone marrow. The differential count of the nucleated cells gave the following figures: Normoblasts, small, 12.1 %; large, 21.2 %; macrocytes of the second generation, 15.2 %; macrocytes of the first generation, 36.3 %; megaloblasts with large nuclei, 15.2 %. Turning to the question of the leukocytosis, a striking peculiarity of the polymorphonuclear cells is referred to. The larger proportion of these contain granules, and the author refers to the rarity of this condition and states that according to Ehrlich there have been but 4 such cases reported. [To these we can add a personal observation and refer also to a case of leukemia recorded by A. E. Taylor which had the same character. He found that there were transitional cells between the nongranular and distinctly granular forms.]

Treatment.—Heaton¹ records a case of splenomegalic leukemia remarkable for the tolerance of arsenic. Administration by the mouth caused gastric irritation. The hypodermic use was therefore begun. In a total number of days of 271, including intervals amounting to 58 days, as much as $5\frac{1}{2}$ grains of arsenious acid, 105 grains of arseniate of soda, and $10\frac{2}{3}$ grains of cacodylate of soda was administered hypodermically. In addition, $10\frac{2}{3}$ grains of cacodylate of soda was administered by the mouth. The maximum dose administered at one time was $2\frac{2}{3}$ grains of arseniate of soda, equivalent to 4 drams and 26 minims of liquor sodæ arseniatis. There were never any signs of poisoning as evidenced by pigmentation of the skin, neuritis, irri-

¹ Lancet, Jan. 26, 1900.

tation of the conjunctivas, or subjective symptoms. Latterly some mucous diarrhea occurred. The drug was rapidly eliminated in the urine, Marsh's test showing large quantities during 24 hours after injection, and then rapidly diminishing amounts for several days afterward. The solution used was a 1 : 500 solution of eucain hydrochlorate containing 1 grain of arseniate of soda to each 15 minims, and all metal syringes were used, so that the solution could be heated prior to injection, as the cold solution invariably produces considerable irritation. No local trouble was caused by the injections at any time.

F. Friedmann¹ describes a case of lymphatic leukemia, directing especial attention to the **relation between blood pressure and the lymph circulation**, as indicated by the degree of lymphocytosis. Digitalis was used in this case repeatedly, and its use repeatedly stopped. It was noted almost regularly that the use of digitalis caused a decrease in the size of the lymph-glands and an increase in the lymphocytosis. This he believes was due to the increased pressure resulting from the action of the digitalis, and the consequent increased outflow of lymphocytes from the lymph-glands into the blood.

PSEUDOLEUKEMIA.

T. Crowder² describes a case of **generalized tuberculous lymphadenitis with the clinical and anatomic picture of pseudoleukemia**. The patient was a man of 34, whose family and previous history was of no special consequence. He had marked loss of weight with swelling of the cervical and axillary glands; there was no mention of the condition of other glands. He afterwards showed an increasing degree of prostration, with irregular fever. Ultimately a severe diarrhea developed, and he died with a high fever. The blood had shown a secondary anemia with 19,000 leukocytes; the polymorphonuclears constituted 67%, the small uninuclears 30%, the large uninuclears 2.5%; myelocytes and nucleated reds were absent, and there was no polychromatism or poikilocytosis. The postmortem examination showed general glandular hyperplasia, changes thought, from the gross examination, to be lymphoid nodules in the liver, spleen, and lung. The microscopic examination, however, showed that the condition was tuberculosis, and there was a terminal infection with *Staphylococcus aureus*, to which the terminal leukocytosis of 19,000 was probably due. There was no old or recent tuberculosis about the lungs or intestines or any other part directly accessible to external infection. It is therefore probable that the tuberculosis of the glands of the neck was the primary seat of the disease. Crowder considers that while various conditions are evidently classed under the name of pseudoleukemia, the symptom-complex determines the disease clinically as it is now understood, and he therefore considers that there is no reason to exclude those cases in which the cause is known to be the tubercle bacillus. Such cases should merely be put under a subdivision, for from the clinical standpoint they are

¹ Wien. klin. Woch., Dec. 6, 1900.

² N. Y. Med. Jour., Sept. 15, 1900.

pseudoleukemia; in fact, the only definite way of making a diagnosis of tuberculosis in many cases is by inoculation into susceptible animals. [Authors who have described cases of supposed tuberculous pseudoleukemia have not generally been careful to distinguish cases in which the histology has been that found in classical Hodgkin's disease from the cases of manifest tuberculous adenitis.]

SPLENOMEGALY AND SPLENIC ANEMIA.

N. E. Brill¹ contributes a very interesting report of **3 cases of splenomegaly occurring in one family**. As the family history is of consequence, he refers to it in detail, but without discovering any facts of importance. The mother of his patients had 6 children. The eldest is in perfect health, the second died at 3 years of marasmus and diarrhea, the third is one of the cases reported, the fourth is in good health, and the fifth and sixth are 2 of the 3 cases described. The third case did not come under his observation, but he learns that the boy suffered from the third year until his death. He lacked energy and could not run and play like other children. The abdomen increased in size and there was increasing languor toward the end of life. All of his physicians agreed that there was great enlargement of the spleen, but nothing definite was determined. No examination of his blood was made. The third child, now 34 years old and married, but without children, had always been healthy and active until some time after her marriage in 1888. She first noticed an enlargement of the abdomen on the left side and an enlarged spleen was detected. The liver and the lymphatic glands were not enlarged. The thoracic organs were normal. A rough blood-count seemed to show an excess of white cells. The case was first regarded as leukemia. In 1895 he saw the patient again and found the spleen larger. She had been under constant treatment with quinin and arsenic and various forms of injection into the spleen. Two attacks of pleurisy had occurred, and in 1896 a crop of hemorrhagic furuncles. The blood-count this time showed 4,800,000 red cells, 7168 white, and 80% of hemoglobin. She went through an attack of typhoid fever in 1896, and after this some changes occurred in her condition. The skin became shriveled and showed dark pigmented spots scattered over the trunk and extremities. These are the remains of the hemorrhagic furuncles. Over the scleras of each eye is a wedge-shaped patch of yellow color extending from the corneal margin to the canthus of the eye. The abdomen is greatly enlarged. The liver is somewhat enlarged and the spleen very much. Examination of the blood gave approximately the same result as before. The differential count of the leukocytes showed polymorphous 65%, large mononuclears 5%, small mononuclears 30%, very few eosinophile cells. The third patient is now 30 years old, is married, and has one child a year old. He was not robust until after his ninth year, having had most of the acute infectious diseases. He has always been active in his

¹ Am. Jour. Med. Sci., Apr., 1901.

business. Splenic enlargement was discovered in 1889. His condition at that time was perfectly good. Arsenic was given and for a time taken regularly. Frequent epistaxis occurred in 1890 and recurred in 1893. The blood-count showed 5,400,000 red corpuscles, 7168 white corpuscles, 90% hemoglobin. Repeated blood-counts gave about the same figure. He had the same patch of yellow color on the sclera as has the other patient. There was no enlargement of the lymphatic glands, but the liver kept pace with the spleen. He had an attack of bloody dysentery in 1900, and this was followed by hemorrhagic furunculosis, leaving pigmentation similar to that seen in his sister. The interesting points in these cases are the occurrence of the cases in one family, the absence of anemia, the tendency to hemorrhages and hemorrhagic furuncles, the brownish-yellow nonicteric color of the skin, the prolonged clinical course, and the peculiar yellowish thickening of the conjunctivas. These peculiarities, he believes, are sufficient to exclude these cases from splenic anemia as it is usually described. He can find no satisfactory pathologic explanation.

E. J. Brown¹ reports a case of splenic anemia which occurred in a man of 54, who had a history of severe malaria 15 years before, but no venereal history, and no other history of importance. His illness began with loss of health, which had persisted for over 2 years, when he exhibited hemoptysis, which subsequently recurred several times. There afterward occurred dyspnea, palpitation of the heart, edema of the legs, and persistent cough. The man was markedly anemic; he had enlargement of the spleen, which increased to a considerable degree within a few months. The blood-examination showed 35% hemoglobin, 1,450,000 reds, 6300 whites; nucleated reds were absent, but there were numerous microcytes and macrocytes. There was **marked abdominal effusion**. He was twice tapped, and large amounts of a pinkish fluid were removed from his abdomen. The disease lasted 2 years and 5 months in all. The autopsy showed marked emaciation, extensive abdominal effusion, no enlargement of the lymph-glands, uniform enlargement of the spleen, the organ filling the greater part of the left half of the abdomen, moderate enlargement of the liver without the appearance of cirrhosis. Microscopic examination showed marked hyperplasia of the stroma of the spleen, with collections of lymphoid cells. The liver showed collections of lymphoid cells, and the pancreas showed small cell infiltration.

A. O. J. Kelly² describes a case of splenic anemia in a girl of 22, who had been in fairly good health until May, 1899, after which time she had never been entirely well. She had a fall in the latter part of the summer of 1899, and subsequent to that time had pain in the splenic region. The spleen was found enlarged, and there was some tenderness over it. The urine showed nothing. There was a systolic murmur at the base of the heart, but no other cardiac symptoms were observed. The blood showed 50% of hemoglobin, a moderate reduction of the reds, and no leukocytosis. She had some articular pains, but no sweats.

¹ Phila. Med. Jour., Feb. 12, 1901.

² Med. News, Jan. 12, 1901.

Improvement occurred at first under the use of arsenic, but she grew worse again; splenectomy was suggested, but the idea was rejected. Fever was present throughout the course of the disease, going as high as 103°. The patient, toward the latter part of life, had severe dyspnea. One notable symptom was **bleeding from the genitalia**. A post-mortem examination could not be obtained. Ulcerative endocarditis could be eliminated in the case only with difficulty.

M. Netschajew,¹ after a study of the literature and his personal observations, comes to the conclusion that the **splenic anemia of infants** shows no symptom which speaks for an individuality of this form of anemia. He directs attention to the fact that the blood changes with disease of the spleen are exceedingly varied in different cases.

THE HEMORRHAGIC DISEASES.

PURPURA.

A. Bruck² considers that by more careful observation one may frequently **determine a definite relationship between rheumatic purpura and angina**. He describes 4 cases in which an undoubted purpura of the so-called rheumatic type occurred in association with angina. In 3 of these cases the throat affection was scarcely noticed, but in the first it was severe. He also notes in 2 of these cases the association of marked muscle pains, and particularly of torticollis. He believes that the clinical appearance of angina must be considered to be closely associated with both rheumatism and other rheumatic affections, and believes that so-called muscular rheumatism is usually a bacterial affection. The clinical picture seen in these various cases is the result of localization of the microorganisms in the tonsils or in other tissues, hence the varied symptoms found in these cases. He also notes a case in which polyarticular rheumatism followed upon middle ear disease, and a relapse of the rheumatism was coincident with mild relapse in the ear trouble. In rheumatic affections of all kinds he thinks it is of the utmost importance to observe the tonsils carefully, and also to have in mind the ear and other organs through which infection might readily occur. [There is no doubt that infection of the tonsils, rheumatic conditions, and purpura are frequently associated; but this does not demonstrate that all these are manifestations of but one condition. Purpura is almost unquestionably due to a variety of causes and is certainly related to a number of diseases quite as closely as to rheumatism, and the only justification of the term "rheumatic purpura" is the fact that articular changes are very frequently seen with the disease, and it often occurs in rheumatic subjects. This does not demonstrate that the purpuric condition is due to the same cause as the rheumatism.]

P. Edel³ describes an **interesting case of rheumatic purpura** which occurred in a man of 41. There was a history of probable

¹ Bolnit. Gaz. Botkina, Nos. 30, 31, and 32. ² Berlin. klin. Woch., Nov. 5, 1900.

³ Deut. med. Woch., Sept. 27, 1900.

pneumonia 10 days before the man was seen; he had severe bronchitis without fever, but with albuminuria and decided polyuria. A few days later he had some purpuric spots on the left arm, which increased rapidly in size to about an inch in diameter, and were decidedly elevated above the skin level. Fresh hemorrhages occurred rapidly, until within about 4 weeks almost every portion of the body had shown purpuric spots. About 3 weeks after the purpura appeared, a mass, which was evidently a hematoma, was observed on the left arm, and afterward 16 more similar hematomas, all on the left side, were seen. The case finally resulted in cure, no medication having had any apparent effect upon it. The case was not one of hemophilia; there was no evidence of scurvy, and it was decided that it was a rheumatic purpura. The cause of the purpura in this case seemed undoubtedly not sepsis, since bacteriologic examination of the blood was negative; there was no leukocytosis, no involvement of the heart, and the spleen was not enlarged; besides this, no general condition would have been likely to have caused the occurrence of 17 hematomas on one side of the body. This latter observation led to the **decision that nervous vasomotor influences had produced the condition.** Striking symptoms observed in the case were the occurrence of severe sweats, stomatitis, open hemorrhage from mechanical influences, elevation of the hemorrhages in the skin above the skin level, an increase in the tension of the pulse, together with a decided increase in the rapidity of the coagulation of the blood. Coagulation occurred so quickly that it was difficult to get enough blood for the ordinary clinical examinations even with a free incision. An observation of some interest was the fact that the blood plates were very largely increased.

R. Muir¹ describes a case of **purpura and intense anemia, with marked deficiency in the red bone marrow.** It occurred in a boy of 14, whose illness began with a chill, some cough, and hemoptysis. When admitted to hospital a month later he had severe anemia and general oozing of blood from the gums. He had had nose-bleed, hematemesis, and general purpuric eruptions. He improved somewhat, but about a week later he had another eruption of purpura, afterward vomited blood, and soon died. The red blood-corpuscles were found reduced to 800,000 shortly before his death, and the hemoglobin to 11 %, while the leukocytes were 7000. The red corpuscles showed some alteration in size and shape, but megalocytes were practically absent, and there were no nucleated reds seen. The polymorphonuclears were reduced to about 25 % of the whole number of leukocytes, while the lymphocytes reached about 70 %. Eosinophile cells were practically absent, as were also blood plates. The urine contained neither blood nor albumin. Postmortem there was found a large deposit of iron pigment in the liver and kidneys, the bone marrow was found to be almost exclusively fatty and of whitish appearance, without any of the red color so often found in severe anemias. The bone was also thickened and unusually hard. The marrow was so fatty that when passing

¹ Brit. Med. Jour., Sept. 25, 1900.

through chloroform for embedding in paraffin practically all the marrow was dissolved. There was widespread fatty degeneration in the organs in general, this being very strikingly marked in the small blood-vessels. Microscopic examination of the bone marrow showed that red corpuscles and normal marrow-cells were practically absent, the tissue consisting almost entirely of fat. There was no deposit of pigment in the bone marrow.

LeNoble¹ discusses **the clot and the serum in the various purpuras in relation to their value in prognosis**, and in connection with the pathogenesis of the special form of purpura. He found that in some cases of purpura the clot separated well from the serum, while in other cases there was practically no separation, and the whole body of clot and serum formed a compact mass. As a rule, even if the latter were not the case, the separation of the clot and the serum was much slower and less complete than under normal circumstances. On this basis LeNoble separates various forms of purpura. In Werlhof's disease he states that the conditions are most marked; in this there is no retraction of the clot at all; also the hematoblasts show marked changes both in size and in structure, and there are always nucleated red cells. With these signs there may be found slight leukocytosis together with marked anemia. Much the same conditions are found in the severe chronic cases of purpura hemorrhagica. When the clot retracts to some extent and there are less marked changes in the hematoblasts, and when there are fewer nucleated red cells, the condition is a midway stage between the severe and the mild form. Finally, there are forms in which the blood, as to clotting and the condition of its corpuscular elements, seems to be practically normal. These are the mild grades of purpura seen in rheumatism, scurvy, and in some infections and cachexias. The retractility of the clot, therefore, according to LeNoble, has decided prognostic value, though it is notable that the retractility is lost in Werlhof's disease, which is likely to run a satisfactory course.

S. S. Burt² reports the case of a boy of 11, who had a family history of tuberculosis, and whose family history showed that two other children of his generation had shortly before had slight purpuric eruption on the lower extremities. About 1 year before the boy was operated upon for enlarged glands of the neck which were **thought to be tuberculous**. The bleeding began from the gums; he had hemorrhagic spots over the body, became anemic and weak, and showed fever, but no local signs. The urine showed casts, red and white blood-corpuscles, and bacteria. The bleeding continued from the gums, the nose, the stomach, and the bowels. On the seventh day of the observation he had repeated bloody stools and bloody vomiting, was stupid and delirious. He died on the tenth day. An autopsy was not made.

L. Buck³ mentions with the utmost brevity 2 cases of what he terms **hemophilia in negroes**. It appears from the report that both cases consisted of prolonged epistaxis.

¹ Arch. Prov. de Méd., 1900, No. 9.

² Boston M. and S. Jour., Nov. 1, 1900.

³ Med. Rec., July 28, 1900.

SCORBUTUS.

A. E. Wright,¹ in discussing the treatment of scurvy, repeats his previous statement that he considers the condition to be one of **acid intoxication**. The herbivora show acid intoxication when given mineral acids in large amount, and scurvy occurs in human beings when the dietary has been one which contains a large amount of elements producing an excess of acids. Corned meats, for instance, have lost a considerable quantity of the alkaline salts which are contained in fresh meats, and the infant food-stuffs so frequently used produce more acid than milk. A further point in support of Wright's theory is that scurvy is relieved or cured by many substances which contain an excess of bases over mineral acids. Wright states that the normal alkalinity of the blood when estimated by adding normal acid to the blood is equal to a one thirty-fifth normal solution. He then reports a series of cases of scurvy observed in the British army in which the **alkalinity of the blood was found to be very greatly decreased**; that is, it neutralized an equal quantity of acid solution of only one-seventieth normal to one two-hundredth normal. Treatment caused the alkalinity to increase rapidly, the most efficient drug being sodium lactate. [The method of determining the alkalinity of the blood is not sufficiently exact to allow one to state that the results which it gives definitely indicate acid intoxication. Further acid intoxication is present in manifold conditions besides scurvy, but causes no known clinical picture which is peculiar to itself, except in cases of coma due to this condition, while scurvy is a very definite clinical condition in its main features. Again, scurvy is almost always absent in cases in which there is known to be severe acid intoxication. Hence the latter condition alone does not seem to be sufficient explanation of scurvy even though intoxication with acids be demonstrated to be present.]

W. E. Hume² considers scurvy to be an infection of the mouth with microorganisms present in decayed food. He thinks that the good effects of lime-juice and fresh vegetables are chiefly due to their antiseptic action upon the microorganisms. The frequent occurrence of scurvy in times of hardship is due both to the condition of the food and to the fact that cleanliness of the mouth is difficult or impossible under these circumstances.

H. Noinski³ reported some observations which he believed indicated a probable **infectious origin of scurvy**. He had in an epidemic of scurvy seen numerous cases arise in persons who were well nourished, but who came in contact with other cases. These cases were mostly seen in persons who were careless of the rules of disinfection. In discussion, Ljubimoff stated that he was far from convinced of the contagiousness of scurvy. Bacteriologic examinations had never shown the presence of any apparent specific organisms, and he was inclined to

¹ Lancet, Aug. 25, 1900.

² Lancet, Aug. 4, 1900.

³ Berlin. klin. Woch., Oct. 29, 1900, S. 988.

consider the disease an especial form of septicemia. He had made attempts to cause infection with scurvy by rubbing scorbutic blood into the mucous membrane of the gums, but had been entirely unsuccessful.

DISEASES OF THE CIRCULATORY ORGANS.

METHODS OF EXAMINATION.

A. V. Holowinski¹ gives an extended description of his so-called **strepitograph**, an apparatus for the photography of the heart-sounds. He discusses its use and the results obtained thereby. The apparatus is complicated, and his results have rather a theoretic than a practical interest.

A. D. Waller² describes what he terms a **digital sphygmograph**, an instrument so arranged that the finger tip is inserted between the spring and a movable support. The pulsatile elevations of the finger nail are transmitted to the spring, and by an attached lever are largely magnified and may be recorded on a smoked surface.

A. Abrams³ describes as a **new sign** an area of dullness in the interscapular region on the left side, which appears when the stomach is distended, and **which indicates upward displacement of the heart**.

A. Abrams⁴ again refers to the **heart reflex** which he has previously described. Irritation of the skin over the precordium or even over distinct parts of the body has been found in his investigations to produce contractions of the myocardium. Similarly, irritation of the skin causes a dilation of the lung, and vigorous rubbing of the skin of the precordium is sufficient to obliterate the superior area of cardiac dullness. He states that while it is difficult to determine this by percussion, it is easy by the use of the x-rays, the lung area becoming increased in brightness after the friction. His observations would therefore confirm the view of those who hold that balneotherapeutics is useful in cardiac disease on account of the cutaneous irritation. Regarding this method of treatment and the manner of operation, he concludes that (1) dilation of the lung follows the exercise and bath treatment, the lung acting as an excretory channel for the overburdened heart; (2) the cause of the lung dilation is the cutaneous irritation caused by baths and exercises; (3) a decrease in the volume of the heart is similarly caused by the cutaneous irritation.

M. Herz⁵ believes that important results may be obtained by **ausculting the muscles** during tetanic contraction, a method of examination which has not been carried out previously, but may, among other things, be interesting in connection with cardiac conditions. He recommends that the patient stand on tiptoe, leaning against a piece of furniture or the wall, and that one then auscult the calf muscles; or that while he is pulling against a towel thrown round his neck, the biceps

¹ Zeit. f. klin. Med., Bd. XLII, H. 3 u. 4.

² Brit. Med. Jour., Sept. 22, 1900.

³ Med. Rec., Sept. 8, 1900.

⁴ Med. Rec., Jan. 5, 1901.

⁵ Centralbl. f. innere Med., Jan. 5, 1901.

be ausculted; again, the deltoid be ausculted while the arm is held elevated, etc. It is unnecessary to uncover the skin, as the sound is readily heard. It consists of two parts—a musical tone and a noise. He found that in cases in which the muscles are strong and contract well the sound is soft, high-pitched, and hollow; while it becomes more sonorous when the innervation of the muscles is disturbed. He thinks that in the discussion of the origin of accidental heart-murmurs important points may perhaps be determined by making coincident examinations of the general muscle-sound and the heart-sounds; this may show whether alterations in the cardiac muscle are active in producing the abnormal sounds directly. He discusses two views concerning the origin of the muscular contractions in Thomsen's disease. These are, on the one hand, that it is a contraction like a tetanus and has a central origin; the other theory attributes it to a spasm of the muscle-fibers themselves that so shortens them that they cease vibrating. In the former case the muscle-sound should be loud; in the latter case it should be absent, or nearly so. In one case which Herz had the opportunity of examining he found the muscle-sound entirely absent. An interesting observation in relation to heart-disease was communicated to him by Heitler. A patient in coma was observed to have a peculiar sound over the heart, and coincident examination of the biceps demonstrated the presence of a hum that soon became a strong murmur, and at the height of its intensity seemed like separate tones. Laënnec in 1820 described a muscle bruit, and drew attention to its similarity to heart-murmurs.

J. F. O'Carroll,¹ in a discussion of **accentuation of the second heart-sound** in the pulmonary area, states that he believes that as a rule the accentuated sound is really the second aortic, even in cases of mitral disease, and its loudness is due to increased amplitude of the recoil wave in the systemic arteries. [This view seems to be the result of the fact that O'Carroll apparently uses no more exact method of determining whether the accentuated sound is pulmonary or aortic than mere auscultation directly over these two areas. There can be no serious question that the accentuated sound heard in most cases of severe mitral disease is an accentuated second pulmonary sound.]

GENERAL CONSIDERATIONS CONCERNING DISEASES OF THE HEART.

Litten² considers **endocarditis**, except the atheromatous form, to be always a complication, and caused by microorganisms. He uses the terms *endocarditis verrucosa* and *ulcerosa* only in regard to pathologic anatomy, and from a clinical standpoint divides the endocarditides into (1) *endocarditis benigna*, as *rheumatica*, *peliotica*, *choreatica*, *gonorrhoeica*, *scarlatinosa*, *morbillosa*, *variolosa*, *diphtheritica*, *typhosa*, *pneumonica*, *tuberculosa*, *ex influenza*, and *traumatica*; (2) *endocarditis maligna*; (*a*) *nonapostematosa*, as *rheumatica*, *choreatica*,

¹ Dublin Jour. Med. Sci., Sept., 1900.

² Wien. med. Woch., Oct. 27, 1900.

and gonorrhoea; (b) septicopyæmia, apostematosa; primary or secondary to one of the aforementioned through infection with pyogenic microorganisms. Endocarditis benigna may cause no clinical symptoms or may lead to chronic valvular disease. Malignant endocarditis is always dangerous, either mechanically (rheumatism, chorea, gonorrhoea) or infectiously (septicopyæmia and mixed infections). The former are nonsuppurative, the latter always suppurative. Benign and malignant gonorrhœal endocarditis, as well as benign and malignant rheumatic endocarditis, is due to the same microorganism, of different degrees of virulence.

W. Ewart¹ gives an extensive discussion of the clinical view of some of the **mechanisms of the heart and its valves**. He considers that the systolic action of the heart is chiefly constrictive, proximating the heart-wall almost completely to the septum, while some shortening of the longitudinal fibers occurs, the chief shortening being seen on the anterior wall of the conus, in the papillary muscles, and at the auriculo-ventricular orifices, the latter being carried downward and backward, thus increasing the ventricular pressure and the aspiration of the auricle. The normal mitral closure, he believes, is due to contraction of the fibers about the orifice and pressure of the valvular membranes together by the blood mass. The mitral valve flaps are during systole drawn almost vertically downward under normal conditions. The two types of closure of the mitral valve are seen: that with the normally contracted orifices and that with uncontracted orifices. In the former, the normal condition, the closure of the mitral valve is made doubly secure by the contraction of the orifice and the almost vertical coaptation of the valves over a wide area. This is what he terms the low closure. The high closure is seen in dilated hearts when the orifice does not contract to any extent, and consequently the closure becomes almost entirely membranous and the valves become more or less horizontal. The capillary muscles through their contraction stretch the valves downward and hold them taut, helping to depress the ventricular orifices and to make a low closure. They also have a large share in the production of the first sound and also in steadying the aorta and insuring its patency. Ewart considers the common systolic functional murmurs to be but imperfectly explained, but probably the valves are themselves sound, and very likely the difficulty is muscular or neuromuscular, with imperfect closure of the orifices. One great reason that the lesions of the heart cannot be readily cured and are likely to advance is that the organ is never rested and the lesions are constantly irritated. Besides primary valvular defects, stiffness of the myocardium or epicardium may cause incompetency. Ewart considers that the habitual attitude of the valve will largely determine the ultimate effect of a lesion upon the blood current. If the valve is kept well downward in the ventricle, fibrosis and shortening overtake the chordæ; but if the orifice is dilated and the valve is raised high, the valves themselves will show the chief shrinkage and the chordæ will be little

¹ Brit. Med. Jour., Oct. 20, 1900.

involved and will rather tend to be stretched; hence he believes that stenosis is the lesion which is most likely to occur in strong hearts in which what he terms the low closure occurs, while regurgitation will occur chiefly in hearts with yielding walls and wide ventricular orifices. This view is, he thinks, supported by the common occurrence of stenosis in young, healthy persons. In stenosis the auricle invades the ventricular cavity and reduces the space of the ventricle, acting somewhat like a foreign body wedged into the ventricular orifice, and distending the ventricle when it should be contracted. This explains the delay in contraction and the abnormally loud presystole so characteristic of stenosis. The mitral valve acts in this case practically only through the tension of the stiffened membrane, which is due to the papillary muscles, and this, in Ewart's opinion, explains the loud first sound. He explains the murmurs heard in mitral stenosis as follows: The first ventricular effort in emptying the auricular funnel results in a rush of auricular blood into the funnel and produces the early murmur of diastole. The rumble throughout diastole is due to the rush of a stream of blood across the rough orifice and the papillary muscles and chordæ. The presystolic murmur is due to a fluid vein coursing toward the apex, and in Ewart's opinion may be compared to the noise made by a stream forced from a syringe which is held in water. At this period he thinks that the chordæ are not apt to vibrate, as the ventricle is already nearly full. The crescendo character of the murmur he attributes to increasing pressure upon the funnel through contraction of the ventricular orifice. During the period of presystole there are two streams from the funnel, a regurgitant and an advancing stream, the former being but slight because of the pressure of the auricle which is in systole. When auricular traction ceases the reflux flow is much increased and an audible fluid vein is heard. When looked at in this way, Ewart thinks that the occurrence of a murmur which is heard continuously in presystole and systole is explained, because no reversal of currents takes place, there being merely an increase in the regurgitant flow. If the contractile fibers of the auricles and ventricles become worn out, some of the murmurs become obscure, a fact frequently observed clinically. The pulse of mitral stenosis is described as being of two kinds, depending upon the presence of good compensation or the failure of compensation. In the first instance the pulse is like that of aortic stenosis, and Ewart believes its character is due to some slight obstruction in the aortic current by encroachment of the funnel into the infraaortic space. When compensation fails and the funnel becomes more stretched, it soon becomes of such a size as to form a dangerous obstruction.

N. Moore,¹ in a paper on the clinical study of cardiac disease, after describing the proper method of examining and recording such cases, states that **faint murmurs may often be made more intense** by allowing the patient to **inhale a capsule of amyl nitrite**. He refers to the fact that the thrill of aortic stenosis may be felt at both the apex

¹ Lancet, Oct. 20, 1900.

and the base, and sometimes only at the apex. In the latter case he thinks that probably the aortic cusp nearest the mitral valves is chiefly or solely diseased. He also refers to the fact that aortic murmurs are sometimes much more distinct at the apex than at the base, and that any systolic murmur heard at the apex is likely to be heard at the angle of the left scapula. Presystolic murmurs are not heard at the apex. He considers the diagnosis of congenital pulmonary stenosis, with defect of the septum from mitral disease developed in early life to be very difficult. In the former condition, however, it is of some importance to remember that the pulse is normal and the child develops only imperfectly. He considers that all cases of rheumatism in childhood should be managed as cases of acute endocarditis.

A. P. Langow, ¹ after a study of the **influence of the body position upon the frequency of the heart contractions**, decides that the increase in the frequency of the pulse after changing from the horizontal to the vertical position is due to the muscular contractions necessary in keeping the body in the vertical position, also to a reduction of the intracardiac and arterial pressure, which acts upon the heart ganglia, and to a reduction of the intracranial pressure, which decreases the activity of the inhibitory centers in the medulla. The especially marked tendency to rapidity of the pulse upon assuming the vertical position which one sees in convalescence is due to more marked changes in the arterial pressure than those which occur normally. Patients with anatomic changes in the heart and vessels show the normal influence from change in position so long as the cardiac ganglia have not lost their normal irritability. It is lost, as a rule, in cases of marked disturbance of compensation, though sometimes retained even in cases of pronounced loss of compensation. In the latter class—*i. e.*, those showing absence of a change in the pulse frequency or even a reduction upon assuming the upright position—one should anticipate the occurrence of loss of compensation.

Thomas ² notes the teaching of Bard that **cyanosis** (blue sickness) is due to increase in the pressure of the left auricle without corresponding increase in pressure in the right side of the heart. Bard thought that this was probably due to persistence of the foramen ovale with a membranous closure of the opening, the membrane being forced open if the left auricular pressure became unduly high as compared with that of the right. Bard afterward reported some cases in which there was profound cyanosis with entire closure of the foramen ovale, and Thomas reports similar cases in which there was severe pulmonary disease. The chief characteristic in these cases of pulmonary lesions was an extensive destruction of lung parenchyma without destruction or obliteration of the vessels of the diseased area. The result, in Thomas's belief, would be that a large portion of the blood would pass through the lungs without being oxygenated. This he considers sufficient to explain the cyanosis.

¹ Deut. Arch. f. klin. Med., Bd. LXVIII, H. 3 u. 4.

² Zeit. f. klin. Med., Bd. XLII, H. 1 u. 2.

F. Ott¹ has investigated the urine of 12 cases of heart-disease in order to determine whether the yellowish discoloration of the skin seen in these cases was actually due to bile pigment. He obtained positive results, both with Gmelin's test and calcium chlorid precipitation, indicating that the **skin pigmentation was actual jaundice.**

M. Heitler² refers to his previous observation that **percussion of the region of the liver or the heart** was followed in a neurasthenic man by an increase in the size of the pulse, and that changes in the volume of the pulse were also noted at times when no special manipulations were undertaken. Increase in the size of the pulse was followed by decrease in the size of the heart-dullness. He has made a study of this phenomenon in a series of cases, chiefly in persons convalescing from acute disease, and finds that in a minority of cases the phenomenon appears only after irritation of the region of the liver and heart. In most cases it is seen also after irritation of the skin, either of a limited area or of the whole surface, and after irritation of the bones, the muscles, the mucous membranes, and the arteries, and after flexion and extension of the members. Those persons who show the reflex after irritation of various regions exhibit a marked variation in the manner in which the reflex is excited. Sometimes it appears after irritation of certain regions of the skin, sometimes after irritation of any region or any tissue, and at other times various conditions are seen between these two extremes. The reflex excited by irritation of the heart region is most marked when the sternum is percussed, though a considerable reflex is usually excited by percussing the ribs, particularly on the left side near the sternum, and especially after irritating the region over the fifth rib on either side in the area between the parasternal and mammillary lines. Percussion of the intercostal spaces is likely to produce no effect, though it may have either a weak or an active result. As to irritation of the liver, a reflex follows only after percussion over the liver, not after percussion of the immediately surrounding regions. The reflex varies in the same person both on the same day and on different days, and the reflex from various regions differs at different times. A reflex produced by irritation of one region disappears after a variable period if the irritation of this region is persistent. Excitation of the pulse by irritation of one region, however, though after a time losing its effect, produces an increased irritability of the pulse to stimulation of other regions. Likewise, if the reflex is not excited by irritation of the skin, percussion of the liver or some other regions will often be followed by excitability of the pulse when the first region is again irritated. The degree of the reaction varies greatly. It is most marked after excitation of the region of the liver and of the sternum, next after irritation of the surrounding areas over the ribs, and then after irritating the skin, next the bones, and finally the muscles. It is not greater after irritating a broad area of skin than after exciting a small area. The degree to which this reflex may act is shown by the fact that Heitler, in a case of severe coma in which no pulse was palpa-

¹ Münch. med. Woch., July 3, 1900. ² Centralbl. f. innere Med., Mar. 16, 1901.

ble, was able to feel the pulse definitely after using this method of excitation.

Grassmann¹ discusses the clinical conditions of the **circulatory organs in the early stages of syphilis**, reporting his examination of 288 patients. Most of these persons were women, the reason for this being that women were kept under control while the men were not, therefore the latter could not be so well investigated. Sixty-six of the patients showed some circulatory disturbance; bradycardia was seen once; arrhythmia alone in 6 cases, and with some alteration of the heart-sounds in 3 cases; in 10 cases there was arrhythmia with tachycardia; in some cases there was tachycardia alone. These conditions were sometimes temporary, but sometimes persisted for several months. Fourteen cases showed a distinct murmur or impure sounds; in 6 of these cases recovery from the syphilis caused the murmurs to disappear. The murmurs were thought to be chiefly functional because they were systolic in time, and were heard chiefly at the base of the heart. Palpitation was frequently complained of. In 32 cases murmurs were heard at the beginning of treatment, probably as a result of nervous or muscular disturbance of the heart itself. In 17 cases the symptoms grew worse during treatment of the syphilis, but in most of them the contrary was observed. In 3 cases he thought that an organic mitral regurgitation was developing. He notes, however, that accentuation of the second pulmonary sound was repeatedly heard without any evidence of enlargement of the right ventricle, and he does not believe that the accentuation of the second pulmonary sound always indicates enlargement of the right ventricle.

Acute Endocarditis.—Jackson² insists upon the **value of leukocytosis in the diagnosis** of malignant endocarditis. He believes that the increase of leukocytes is invariably present at some stage and must prove useful as a diagnostic aid in distinguishing malignant endocarditis from such conditions as malaria, acute tuberculosis, and typhoid fever. [Leukocytosis is undoubtedly of value in diagnosis, but it is impossible to place very strong dependence upon it in the diagnosis of any one definite condition without falling into numerous errors.]

N. S. Davis, Jr.,³ describes a case which he considered **malignant endocarditis, in which recovery occurred**. The patient was admitted with gastric disturbance, and with occasional attacks of dyspnea. After the subsidence of these symptoms fever appeared and at first pursued a somewhat typhoidal course, and the spleen became enlarged. The Widal test was negative, as was the search for plasmodia. The temperature declined somewhat. About this time it was noted that the heart-sounds were becoming weak, and there was a rough second aortic sound; subsequently a distinct murmur developed. Severe chills occurred. Unguentum Cr  d   was used, and the patient gradually began to recover, the aortic murmur disappearing, but the sound remaining impure. The diagnosis of malignant endocarditis was based upon the

¹ Deut. Arch. f. klin. Med., Nov. 1, 1900.

² Boston City Hosp. Rep., 1900.

³ Jour. Am. Med. Assoc., Jan. 5, 1901.

occurrence of a septic temperature course, the signs of cardiac mischief, and the exclusion of typhoid, malaria, and tuberculosis. There was a trace of albumin in the urine, and a positive diazo reaction. Emboli were apparently absent throughout the course of the disease, but there was leukocytosis. A phlebitis occurred during the course of the disease, but was rapidly recovered from.

Stein¹ describes the case of a man of 22 who had gonorrhea, followed by periurethral abscess, which was incised. There was afterward some pain in the finger-joints, but no swelling. Some time later there occurred marked fever, with delirium and skin hemorrhages, but without heart symptoms. The necropsy showed marked degeneration of the heart-muscle, with large vegetations on the mitral valves. Gonococci were not looked for in the vegetation. Stein thinks that so-called **gonorrheal endocarditis** is most commonly the product of mixed infection, the gonococcus favoring the invasion of the organism by pus cocci.

W. Coleman² describes a case of what he considers to be **acute infective endocarditis following vaccination**. The patient was a woman of 23, who had been in good health, except for previous attacks of tonsillitis and some of the milder diseases of childhood. After vaccination she had extensive cellulitis, and following this developed murmurs at the mitral and aortic regions, with enlargement of the heart-dullness, and accentuation of the second pulmonary sound, the murmur at the mitral region persisting. The endocarditis was thought to be due to the septic arm. The patient had had no cardiac disease previous to the vaccination. [The endocarditis apparently had no real relation to vaccinia, but was rather due to sepsis, just as it may be due to sepsis under a variety of other conditions.]

W. Ewart³ reports a case of fatal **malignant endocarditis and right (embolic) hemiplegia** in a man of 26. He had aphasia and right hemiplegia in the early stages, but careful examination of the man showed no disorders of the heart excepting a systolic murmur. There was irregular fever, however, and some rapidity of the pulse, with albumin in the urine. His condition grew worse, the symptoms increased in intensity, and the case was considered to be one of malignant endocarditis. He died rather suddenly while progressing fairly well. He had been given streptococcic serum repeatedly, and was also given repeatedly a saline infusion containing $\frac{3}{4}$ grain of sodium cacodylate. The man's mouth was in exceedingly bad condition; he had stomatitis and numerous decaying stumps of teeth, and the breath was intensely foul. The autopsy showed vegetations of the aortic valves with perforation of one leaflet, and involvement of the myocardium. The left middle cerebral artery contained a clot, and there was softening of the tip of the temporosphenoidal lobe and of the Island of Reil.

S. Gavala⁴ reports a case of **malignant endocarditis with innumerable metastases**. Metastasis had occurred in the brain,

¹ Wien. klin. Woch., 1900, No. 48.

³ Brit. Med. Jour., Sept. 25, 1900.

² Phila. Med. Jour., Dec. 22, 1900.

⁴ Wien. klin. Woch., Aug. 23, 1900.

the lungs, the spleen, the liver, the kidneys, the small intestine, and in various portions of the skin. The patient was a man of 20, who had had articular rheumatism some months before, but at the time of the onset of his illness was practically well. After severe muscular exertion he exhibited palpitation, with pain in the chest, and shortly afterward had a chill. The case then ran the course of ulcerative endocarditis, with fatal issue. Autopsy showed a suppurative tonsillitis and pharyngitis, and there was endocarditis of the mitral valve and also pericarditis and involvement of the myocardium. There were old lesions of the mitral and aortic valves. The organism found was *Staphylococcus aureus*. The tonsils also contained *Staphylococcus albus* and *Streptococcus pyogenes*. Gavalá thinks that the infection took place through the tonsils, and that the acute onset was to be explained by the existence of the acute endocarditis without symptoms until the muscular strain detached some fragments from the valves and caused a general infection.

Caton¹ presents once more a discussion of the method of **treating the endocardium in acute rheumatism**. He recommends absolute rest in bed, warm flannel garments, the use of salicylates, with alkalies, and cholagoges, the latter being used in doses large enough to produce free evacuation, but not diarrhea. The patient should stay in bed long after the disappearance of pain and fever, and kept at absolute rest. Blisters should be applied over the course of the first four intercostal nerves, and iodids and mercury should be given. The diet should be chiefly milk and light farinaceous food, and red meats should be excluded. The results of the treatment of 85 cases of valvulitis in hospital were as follows: Fifty-four showed signs of cardiac trouble, probably recent when they came under Caton's care; 34 of these had no signs of remaining heart trouble when they left the hospital, while 20 still showed disease of the valves. Thirty-one patients apparently came into the hospital with sound hearts and acquired valvular disease after admission; 27 of these, he believes, were discharged with sound hearts, 3 had permanent valvular disease, and one is still under treatment. [We do not wish to seem in opposition to the author's excellent plan of treatment, nor to deny the probability of frequent cures of acute endocardial lesions; but in determining the frequency of such cures it is important to ascertain beyond doubt the existence of endocarditis in the first place and its disappearance under treatment. The mere discovery of a murmur followed by its disappearance does not constitute sufficient evidence.]

J. N. Clarke² reports a case of ulcerative endocarditis in which he used **antistreptococcic serum** with success. The patient had previously had rheumatism, and in the illness reported had a pleural effusion associated with precordial pain, edema of the ankles, and afterward with sudden chill and rise of temperature, the temperature following a very irregular course. Cardiac murmurs appeared, and ulcerative endocarditis was considered to be present. Injections of

¹ Brit. Med. Jour., Oct. 20, 1900.

² Lancet, July 21, 1900.

serum were given every day, or every other day, 10 to 20 cc. being used each time. After recovery from the acute symptoms the patient had a marked systolic murmur, most pronounced in the aortic region. Bacteriologic examination of the blood during the course of the disease was negative.

Chronic Endocarditis.—E. Münzer,¹ after directing attention to the fact that prolonged febrile conditions of obscure origin are not at all uncommon, insists upon the importance of that group of cases, under this general class, to which Litten has given the name of **chronic recurring septic endocarditis**. A series of cases is described by Münzer, and he particularly discusses the relation between rheumatism and this form of endocarditis. Three of his cases showed some definite relation to rheumatism; in 2 the symptoms of endocarditis occurred directly after articular rheumatism, and in the third after muscular rheumatism. The general relation between rheumatism and ordinary benign endocarditis is of course well known, and it is also now definitely established that rheumatism is an infectious disease, and the bacteria found in rheumatism are usually the same as those found in septic endocarditis. It is extremely difficult to draw the line between benign rheumatic endocarditis and the more malignant form of endocarditis in which there seems to be some association with rheumatism, and this is especially difficult in those cases in which an endocarditis which apparently arose on a rheumatic basis tends to show repeated febrile recurrences. We should recognize the fact that there is a distinct connection between rheumatic endocarditis and what we commonly put in a separate class and call septic endocarditis. As to the diagnosis, it must be remembered that the symptoms are extremely obscure, and that any suggestion of cardiac involvement is often absent. The diagnosis, as a rule, must be established upon an evening rise of temperature early in the case, followed by an irregular course of fever, with chills, enlargement of the spleen, perhaps definite symptoms of infarct, and hemorrhages into the skin and choroid. Typhoid fever and malaria are most likely to cause confusion. The prognosis is not always absolutely bad. [The value of blood cultures in these cases should not be forgotten. This procedure is frequently very useful in these cases in establishing the existence of an infection and in pointing toward the source.]

D. Gerhardt² discusses the question whether the **changes in the right heart in association with mitral lesions** are really compensatory changes which have the purpose of increasing the failing flow of blood into the left ventricle, as has been taught for years, or whether, as claimed by Basch and his students, these changes are purely secondary, and occur for the purpose of enabling the right heart to carry on its own work without failing, and are due merely to the extra demand thrown upon it. Basch and his students claim that the most serious and important result of mitral lesions is to produce rigidity and

¹ Zeit. f. Heilk., Bd. XXI, S. 251.

² Arch. f. exper. Pathol. u. Pharm., Bd. XLV, H. 3 u. 4.

loss of elasticity of the lungs through overfilling of the pulmonary vessels, and they consider that this explains the severe dyspnea suffered by mitral cases, and also explains many of the other symptoms. Gerhardt has repeated some of Basch's experiments and has carried out some further experiments devised by himself, and as a result concludes that while overfilling of the pulmonary vessels does to some extent reduce the elasticity of the lungs and the amplitude of respiration, this reduction is rather small and by no means sufficient to explain the severe disturbance of respiration seen in mitral lesions; the symptoms exhibited by these patients are due to the imperfect circulation through various organs and not alone to the changes in the lungs. The main primary difficulty, then, in the mitral lesions is to be found in the imperfect flow of blood into the left ventricle. As to the methods in which it is possible to overcome this difficulty, these must all have as a purpose the increase of the auricular pressure as compared with that in the ventricle. Gerhardt had thought that possibly in stenosis the suction action of the left ventricle was so increased as to offer some aid in compensation for the lesion. Were this the case one would expect to find the left ventricle somewhat hypertrophied owing to the overfunctionation. It is, however, not hypertrophied in pure mitral stenosis. The hypertrophy of the left auricle does to some extent overcome the difficulty, but the auricle is likely to fail, particularly when stenosis and regurgitation are combined. Hence there must be some other method of overcoming the trouble. This is, in his belief, to be found chiefly in the hypertrophy of the right ventricle. He was able, by increasing the work of the right ventricle, to cause an actual increase in the pressure in the main circulation, though the increase in the main circulation was much less than that in the pulmonary circulation. The increase in the carotid pressure, however, was sufficient to make this pressure about equal to the normal. He therefore decides that **hypertrophy of the right ventricle does occur as a compensatory measure**, and that it does increase the flow of blood into the left ventricle, and consequently maintains the pressure in the general circulation at about the normal point so long as compensation is complete.

A. Stengel¹ discusses **right-sided hydrothorax due to cardiac disease**. He studied 100 consecutive cases of cardiac disease, and found hydrothorax in 17. The distribution of the fluid in these cases is shown by the following table:

Unilateral, right	5	In 1, possibly aneurysm in left chest; in the other 2, total obliteration of right pleura.
Unilateral, left	3	
Unilateral, right, followed by slighter left pleural effusion	2	
Bilateral, right effusion predominating	7	
Total	17	

¹ Univ. of Penna. Med. Bull., June, 1901, and Trans. Assoc. Am. Phys., 1901.

In discussing the cause of right-sided hydrothorax, he concludes that this is due to enlargement of the right auricle with consequent pressure upon the azygos vein through the root of the right lung. (See Fig. 2.) The fluid shows in its specific gravity and other characters that it is not inflammatory in nature. That the enlargement of the

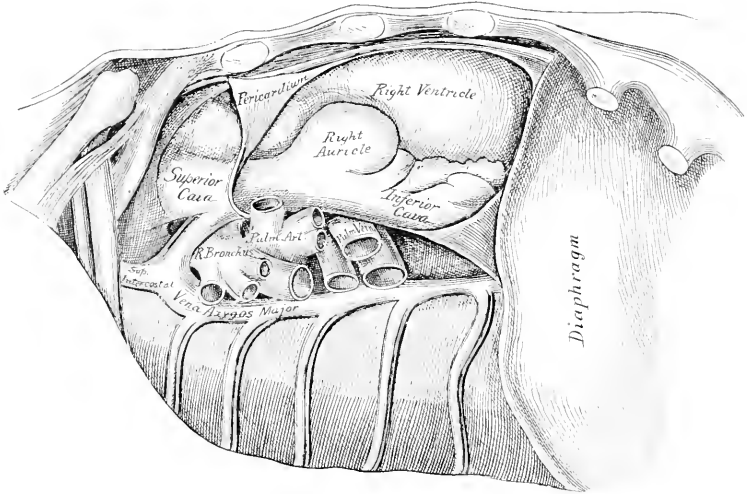


Fig. 2.—Relation of parts as viewed from the right in a case of right-sided hydrothorax.

right auricle is an important cause in this condition was shown in some autopsies which he saw, as well as by anatomic studies of the relation of the parts at the root of the right lung. The tables showing the diagnosis in the cases analyzed and in those in which hydrothorax was present illustrate the predominance of this condition in mitral disease.

TABLE OF ONE HUNDRED CONSECUTIVE CASES OF CHRONIC HEART-DISEASE.

1. Mitral valve alone affected :	
Mitral regurgitation	27
Mitral stenosis and regurgitation	8
Mitral (unspecified)	8
Mitral stenosis	6
Total	49
2. Aortic valve alone affected :	
Aortic stenosis and regurgitation	10
Aortic regurgitation	5
Aortic valve disease	2
Total	17
3. Aortic and mitral disease	13
4. Myocardial disease (fibroid, fatty, and dilated)	13
5. Aortic, mitral, and tricuspid disease	4
6. Mitral and tricuspid disease	4
Grand total	100

TABLE OF SEVENTEEN CASES OF HEART-DISEASE ATTENDED WITH HYDROTHORAX.

1. Mitral valve alone affected :	
Mitral regurgitation	5
Mitral stenosis and regurgitation	2
Mitral stenosis	1
Total	8
2. Aortic and mitral disease	4
3. Aortic, mitral, and tricuspid disease	3
4. Myocardial disease	2
Grand total	17

He points out that some cases of unilateral cardiac hydrothorax are difficult to distinguish from pleurisy with effusion.

Germani ¹ discusses the frequency of **right hydrothorax in mitral valvular disease**. Some authors have ascribed this to an extension of inflammation from the congested liver to the right pleura, but, as Germani points out, the character of the fluid in the pleural sac is not inflammatory. A more probable view, according to him, is that of Baccelli, who states that the hypertrophied right ventricle, sinking by gravity and dragging down the right auricle, causes traction on the descending vena cava and the azygos major. The azygos cannot drop, as it lies over the right bronchus.

S. Wilson ² discusses the **conduction of systolic mitral murmurs down the spine** and ascribes this to the anatomic relations of the left auricle and ventricle to the vertebræ. In mitral disease the posterior part of the lung is pushed aside and the left heart comes in direct contact with the vertebræ. The author was able to demonstrate this by filling the cavities with paraffin. The conduction of sounds to the left interscapular areas affords a useful distinction between mitral and tricuspid murmurs, as the latter are rarely conducted to the back, and in these rare instances always to the right of the spine. A mitral systolic is distinguished from an aortic systolic by the fact that the latter is louder over the upper dorsal vertebra than the lower, the reverse being the case with mitral murmurs. Regarding prognosis, the author concludes that when the murmur is not heard in the interscapular area and is not conducted down the vertebræ, the prognosis is good however loud the murmurs at the apex. There cannot be much regurgitation without well-marked signs in the back. [Our own experience does not coincide entirely with the author's. We have repeatedly observed instances of mitral regurgitation in which the murmur at the apex was comparatively weak, while it was very distinct at the angle of the scapula. This condition of things has been particularly marked in women. Indeed, we believe that the existence of mitral regurgitation is often overlooked in the earlier stages because auscultation is not practised in the scapular area when a murmur is wanting anteriorly.]

Pauli ³ made the interesting observation, in a case of mitral insufficiency with severe loss of compensation, that there was a pronounced

¹ Gaz. degli Osped., Aug. 19, 1900.

² Birmingham. Med. Rev., Oct., 1900.

³ Wien. med. Woch., 1900, No. 50.

pulsation about the ear which was synchronous with the radial pulse. More careful observation showed that the parotid gland was distinctly swollen, and that the whole gland showed what seemed to be a venous pulsation. The veins of the forehead and temples were much distended, and also showed pulsation. The pulsation of the parotid disappeared as compensation was partly reestablished, but could voluntarily be made to reappear if the patient held his breath and strained. The observation seems to be unique so far as records in literature go.

C. Noto¹ discusses the **condition of the left ventricle in mitral stenosis** and defends the paradoxical statement that the normal size of the left ventricle sometimes met with in this disease is the result of pathologic changes. He believes that the primary result of mitral stenosis is hypertrophy. The secondary result is a return to the normal condition and then an atrophy. When, therefore, the normal size is discovered at autopsy, this may be looked upon as the consequence of pathologic processes and not as a physiologic condition.

Gibson² reviews the discussion concerning the **cause of the presystolic murmur in mitral obstruction**, referring to the opinions expressed by various authors. He decides that Gairdner's view is correct. The main point which leads him to reject the theory that the presystolic murmur is due to regurgitation is that the murmur begins in the early part of the diastole, and may even be heard beginning directly after the second sound, and it may be continued without any notable alteration in its quality. This he believes is sufficient testimony that the murmur is due to contraction of the left auricle and that the absence or disappearance of the murmur is largely due to weakness of the auricle.

L. Gallaverdin³ describes 2 cases of **peripheral accidents in the course of mitral stenosis**. The first case was one of embolic obliteration of the superior mesenteric artery, which occurred in an old man who 3 weeks previously had had a left-sided hemiplegia. Autopsy showed atheromatous degeneration of the mitral, with stenosis. In the second case there was thrombosis of the left subclavicular and external jugular veins. This case was interesting because of the favorable course. The patient gradually improved, and recovered both from the effects of the thrombosis and from the serious symptoms due to the cardiac lesion.

Strauss⁴ reported to the Berlin Medical Society a **case of severe mitral stenosis with some aortic stenosis**, in which there had been no murmur during life, but the diagnosis of mitral stenosis had been established upon the observation of marked irregularity of the pulse, accentuation of the second pulmonary sound, decided epigastric pulsation, and pronounced circumscribed tenderness about the apex. Post-mortem examination showed a severe grade of mitral stenosis, with some aortic stenosis and abnormal widening of the pulmonary conus

¹ New Orl. M. and S. Jour., Mar., 1901.

² Edin. Med. Jour., Sept., 1900.

³ Gaz. Hebdom. de Méd. et de Chir., 1900, No. 84.

⁴ Centralbl. f. innere Med., Jan. 12, 1901.

arteriosus. [Most of the signs mentioned are generally accepted as valuable indications of mitral stenosis, but circumscribed tenderness about the apex is not usually described in this connection; from repeated observations, however, we have come to consider it a valuable suggestive sign of this lesion.] A. Fraenkel, in discussion, stated that he believed that the explanation of the disappearance of aortic stenotic murmurs shortly before death is to be found in the decrease of the energy of the heart action. He mentioned a case in which 2 years before there had been a loud murmur attributed to aortic stenosis. Autopsy showed that there was a pronounced aortic stenosis, but when seen shortly before death the patient had presented no murmur except a soft blowing sound at the apex.

A. Hasenfeld¹ has carried out some experiments to determine the **relation between aortic regurgitation and fatty degeneration of the heart**. He passed a fine sound into the carotid artery and damaged the aortic valves with this, then ligated the artery and closed the wound with collodion, being especially careful to observe complete asepsis. The characteristic murmur and pulse were subsequently noted in the animals, and there was no evidence of fever or infection. After 2 or 3 months the animals were poisoned by phosphorus, and after studying the effects of these procedures, he states that the poisoning by phosphorus was borne better by normal animals than by those with artificial aortic insufficiency; that the hearts of animals that had hypertrophied as a result of aortic insufficiency had an especial tendency to fatty degeneration; moderately acute fatty degeneration had no noticeable influence upon the functional capacity of the hypertrophied heart, but marked acute fatty degeneration caused decided decrease in the heart's power, and even produced fatal disturbance of circulation.

Treatment.—A. W. Perry,² in discussing the **causes of heart-failure in chronic heart-disease**, refers particularly to the treatment. He believes that the most frequent cause for failure of hypertrophy and diseased hearts is an acute or chronic toxemia, the result of disorders of digestion and metabolism. Lack of food does not, he holds, affect the heart, as this organ, like the brain, is nourished in starvation at the expense of all other tissues. After failure of the cardiac tonics, comfort for a certain period can often be given and a new compensation established by reduction of the body weight to 10% or 15% less than the normal (2 pounds per inch of height), a restriction of diet to a minimum to retain this weight, and an increased elimination of waste products by massage, baths, increased diuresis, and large enemas. In addition, intestinal fermentation may be restricted by the use of koumiss or sour milk in moderate quantities (16 to 32 ounces per day) and by short courses of mercury. The reduction in body weight does not theoretically affect the heart for the reason given, and practice bears out this view. In a table of 9 cases treated on this plan there was a period of relief ranging from 2 months to 1½ years. Eight of the 9 patients still experienced the relief at the time of the report or when they

¹ Berlin. klin. Woch., Dec. 10, 1900.

² Pacific Med. Jour., Feb., 1901.

passed out of observation. One patient only had died after a year of comparative comfort. The loss of weight in 8 cases ranged from 12 ounces to 20 pounds. In one case, an instance of mitral disease, no loss of weight occurred. The blood-pressure was increased in some cases and diminished in others. The pulse-rate was decreased in all but 1 case.

K. Delio¹ describes a new method for the **mechanical treatment of anasarca** by an apparatus which he has devised for this purpose. It consists of a rubber band which widens at one point, and at this point contains an opening about 8 centimeters in diameter. In this opening is placed a rubber funnel with a tube attached, through which the fluid flows. The skin is disinfected with care, a number of incisions are made close to each other, and the funnel is placed over the incisions and kept closely fixed to the skin surface by means of the rubber band, thus excluding any possibility of infection and of leakage of the fluid. The band should be applied only close enough to prevent the entrance of air. He has treated 15 patients by this method with very successful results, and believes that in severe cases mechanical treatment of anasarca will not infrequently prevent an immediate fatal issue, and may result in very prolonged improvement. It is important that the patient should be placed with the incised areas on a low level. He has seen as much as 12 liters of fluid escape in 24 hours. A valuable feature of the apparatus is that it **allows one to collect and study the fluid**. Delio has done this in a large series of cases of anasarca, and describes his results, particularly comparing the fluid obtained in nephritis with that obtained in cardiac failure with general venous stasis. The most notable fact was that while the nitrogen in the two classes of cases was about equal, the albumin was present in considerably larger amounts in the cardiac cases than in the cases of nephritis. In the former it was always above 2 parts in a thousand, and reached as high as 5 parts in a thousand, while in most cases of nephritis it was present in traces only, and it never went above 1.5 parts in a thousand. This indicated that in nephritis the fluid contained, besides albumin, some nitrogenous substances, which are absent in the mechanical edema of heart-disease, and which are present as a result of imperfect excretion of end-products of metabolism. He also compared the fluids of ascites, hydrothorax, and anasarca as seen in nephritis and in general venous stasis. The transudates in nephritis are, according to his observations and those of others, of lower specific gravity than those seen in cardiac failure. In nephritis ascitic fluid has an average specific gravity of about 1006, hydrothorax of about 1007, and anasarca one of 1007. In general cardiac failure ascitic fluid has a specific gravity of about 1012, hydrothorax about the same, and anasarca about 1008. The fluids of hydrothorax and of ascites have been found by others to contain less albumin in cases of nephritis than in cases of general circulatory failure, and the same thing has been observed by Delio in anasarca, as previously noted. The figures found for albumin in ascites with nephritis were about 0.2%,

¹ St. Petersburg. med. Woch., Dec. 23, 1900.

in general circulatory failure 1.7 %, and Dehio directs attention to the fact that apparently fluid of the subcutaneous tissues is much poorer in albumin than that of peritoneal and pleural transudates. His average for anasarca in cardiac cases was 0.36 % albumin, while in ascites and hydrothorax the amounts found have been about 1.6 % and 1.7 % respectively. Dehio believes that the results which he has obtained confirm the statement which has been made by Hoffmann, that if the fluid of anasarca contains less than 0.1 % of albumin, severe disease of the kidneys may be considered to be present. Dehio found, however, that there were all grades of variations between the very low percentages obtained in cases of nephritis and the apparently high percentages found in cardiac cases, an observation which is not surprising, since renal cases are likely to be complicated by cardiac failure, and *vice versa*; and hence the conditions are rarely those of pure nephritis or pure cardiac failure. After comparing the conditions found in the fluid of anasarca with those found in blood plasma, he directs attention to the fact that the salts in both were about equal in amount, while the albumin and the dry residue were in general much greater in amount in blood plasma than in the fluid of edema. This he considers indicates that in edema the salts pass freely through the capillary walls, while the capillaries offer considerable resistance to the passage of albumin and other organic substances.

K. Miura,¹ after a brief review of the subject, recommends a siphoning **cup-like apparatus in the treatment of anasarca**. Slight superficial incisions are made in the skin, and the glass cup-like apparatus fitted with a rubber tube on to a lateral glass projection, after being filled with a normal salt solution, is applied to the skin, and the end of the rubber tube allowed to siphon into a vessel under the bed. The author had very good results in 3 cases of marked general anasarca, and prefers this method, as it is simple, cheap, easy of application, without pain, and can be performed with asepsis.

H. Hellendall² describes a new apparatus for the **mechanical treatment of diseases of the heart**. The principle is the same as that previously described by Abbè in that it intends to give support to the heart from below. The apparatus, however, differs in that it consists of two shoulder straps to support a band which goes around the waist, the latter band not compressing the whole chest as Abbè's does, but being arranged as a spring and pad, somewhat like that of a hernia truss. The pad is placed beneath the apex and gives support from below, and the pressure comes almost entirely on the pad. With organic cardiac disease he has found it chiefly useful in the after-treatment, but in functional affections such as neurasthenia with cardiac symptoms, in exophthalmic goiter, and even in some cases of organic disease, he has found that it was worn with great comfort throughout the whole treatment and subsequently. The patients stated that they felt marked general improvement, decrease of the palpitation and of the dyspnea, and all were unwilling to cease using the apparatus. He

¹ Berlin. klin. Woch., Sept. 24, 1900. ² Deut. med. Woch., Nov. 22, 1900.

believes that the results were not due to suggestion. He thinks this is demonstrated by the fact that one patient in particular in whom the apparatus caused discomfort in the early stages of treatment, observed great improvement by the use of the apparatus later on, and the patient became enthusiastic in praise of its use.

Zeltner¹ has used **digitoxin** in a series of cases, and believes that its influence upon primary cardiac disease and secondary cardiac affections due to emphysema of the lungs and nephritis is much more rapid, energetic, and protracted than that of digitalis leaves. It may be used by the mouth, subcutaneously, or by the rectum. There is no greater danger of causing disturbance of the stomach or symptoms of poisoning than with digitalis, and the digitoxin was taken better than the infusion. [The usefulness of digitoxin is not generally admitted, however.]

H. Benedict,² after a clinical trial of **hedonal**, recommends it as a hypnotic, particularly in cases in which there is marked circulatory disturbance.

Michaelis³ reports 150 cases of dyspnea due to lung and heart diseases, and to poisoning, treated by **oxygen**. A case of morphin-poisoning was much benefited, and he recommends the use of oxygen especially in gas-poisoning cases.

Congenital Cardiac Disease.—Von Starek⁴ reports a case of simple defect of the ventricular septum, which was observed in a man who died at the age of 45. He had had signs of cardiac disease since early youth and was unable to do heavy work; he had been a cigarmaker from his fifteenth to his thirty-fifth year, but after this he was obliged to take up heavy work because of an injury which interfered with his previous occupation. The result of this was an increase of symptoms which ultimately interfered with his accomplishing any kind of work. The cardiac dullness was found enlarged in all directions, particularly to the left; a short presystolic and a soft diastolic murmur were heard at the fourth intercostal space and at the apex; the second pulmonary tone was accentuated; there was no thrill. The liver was enlarged. The diagnosis during life was mitral insufficiency and stenosis. The necropsy showed a defect of the septum about the size of a quarter dollar occupying the situation of the pars membranacea.

C. Gèrard,⁵ in an extensive discussion of **persistence of the ductus arteriosus**, with an investigation of the literature concerning the subject, decides, so far as the condition is concerned clinically, that it is practically impossible to diagnose it with any degree of certainty. He was even driven to the omission of a chapter on the diagnosis of the condition because his study of the cases reported leads him to the conclusion that the anomaly presents such a wide diversity of symptoms and signs that a diagnosis of its existence is always questionable.

¹ Münch. med. Woch., 1900, No. 26.

² Therap. der Gegenwart, Sept., 1900.

³ Wien. med. Woch., Nov. 10, 1900.

⁴ Deut. Arch. f. klin. Med., Bd. LXVIII, H. 1 u. 2.

⁵ Rev. de Méd., Sept. 10 and Oct. 10, 1900.

Diseases of the Myocardium.—A. Stengel,¹ in a review of the history of cardiac pathology, particularly discusses myocardial disease, and states that it is quite possible that the frequency of myocardial disease has been increasing. He insists upon the importance of recognizing myocardial changes early if treatment is to be effectual. He refers to the probable frequency of myocardial disease as a late result after acute fevers when the cardiac lesion was but little considered at the time of convalescence. He has frequently observed obstinate myocardial weakness in the convalescence from typhoid fever, particularly in young men, circulatory weakness persisting for a year or 18 months after the disease has disappeared. The **signs of myocardial disease** almost always come on insidiously, but one very suggestive sign is a general loss of vitality and strength. When this occurs in elderly persons it should always suggest the possibility of myocardial weakness. A more direct symptom is irregularity of the pulse, which he believes should never, in persons of advanced years, be attributed offhand to accidental causes, but should always suggest possible myocardial change. Weakness of the pulse as compared with the apex-beat is also suggestive if present; the same is true of abortive systole, which is often shown early by the sphygmograph. He also considers **decided relaxation of the skin**, with a tendency to copious sweating, to be suggestive of changes in the heart and arteries; an increasing degree of pallor is likewise an important suggestive sign, as is a decided variability in the specific gravity of the urine, which is frequently marked when the morning and evening specimens are compared. Decided gastric symptoms are also suggestive, particularly gastralgie attacks or nausea. Stengel believes that many of these cases can be arrested in their earlier stages, and that even some restitution may possibly be effected, but an early diagnosis is essential.

K. A. Delio² contributes another paper on **induration of the connective tissue of the myocardium**. Since his previous paper he states that he has made a microscopic study of 36 hearts, and insists even more strongly that his previous view is correct. In some of these cases there was merely atheroma or arteriosclerosis; in others degeneration was due to sclerosis of the coronaries or to marked anemia; but in a number of cases he found diffuse thickening of the heart-muscle resulting from an increase in the interstitial tissue of the heart alone, the network of connective tissue being found thickened as compared with the normal heart of the young person. This is particularly marked upon cross-sections. The increase in the connective tissue results in some atrophy of the muscular tissue, and often the wall of the heart appears to be of normal thickness. He persists in calling this condition senile myofibrosis, a change which is practically the same as pronounced fibroid degeneration of the heart, but is of less marked degree. It occurs most markedly in the ventricles, and is pronounced in cases in which there is some hypertrophy and dilation of the heart. A similar change is seen in the majority of cases of valvular disease in younger persons. In cases in which the strain falls chiefly upon the

¹ Phila. Med. Jour., Oct. 13, 1900.

² Deut. med. Woch., Nov. 22, 1900.

left heart—that is, in instances of disease of the aortic orifice or of the arteries—the left ventricle shows the most marked change, while in cases of pulmonary disease and of disease of the mitral valve, when the strain falls chiefly upon the right heart, the right ventricle showed the most marked degree of myofibrosis.

De Renzi¹ contributes a report of a case of what he calls **splanchnosclerosis**. By this term he means a condition in which there is sclerosis of the myocardium, liver, and kidneys, which is not due to an original disturbance of the heart and subsequent cirrhosis of the liver and kidneys, nor is it the usual disturbance of these organs associated with advanced arteriosclerosis. He believes that the heart, liver, and kidneys are primarily affected as the result of some intoxication, such as alcohol, tobacco, metabolic poisons, etc., and these organs are affected coincidently, not as a result of the myocarditis. De Renzi thinks that this variety of myocarditis can often be differentiated from what he terms the dystrophic form, which is associated with general arteriosclerosis. The cardiac dullness is likely to be widened somewhat; there are no organic murmurs; the heart-sounds are weak but present; and one point upon which he lays much stress is that dyspnea and cyanosis occur under the slightest strain. The strength of the cardiac action is increased by pressure upon the precordia. If angina pectoris, asthma, and sclerotic changes of the vessels are absent and the previously mentioned symptoms are present, he believes that the myocardial changes are due to splanchnosclerosis. The diagnosis in these cases is better than in the dystrophic form. The chief points which he recommends in treatment are the use of milk diet, and spartein, theobromin, and diuretin as drugs.

G. Rosenfeld² answers a previous article by Lindemann, in which the latter author stated that Rosenfeld's theory that so-called **fatty degeneration** is really fatty deposit is not true of cases of fatty change of the heart. Lindemann's reasons for this statement were that he found very much higher figures for the iodine-combining power of the fat in cases of degeneration than with the normal fat of the heart or with infiltration fat. Rosenfeld answers with a sharp criticism of Lindemann's figures and methods. He particularly insists that Lindemann's method, ether extraction, is far less satisfactory than his own method, which in the main consists in boiling in alcohol and subsequent chloroform extraction, after extracting with absolute ether. He shows that results obtained in this way are much higher than those obtained by extraction by ether alone. He then compares the figures which he obtained with normal hearts and with fatty hearts, giving both the chemie results and the results of microscopic examination. In general he shows that while there was a marked increase of the total fat in fatty hearts, and that there was microscopically what is called fatty degeneration of the muscle-cells, the iodine figures in the fatty hearts varied but slightly from the iodine figures with normal hearts. The

¹ *Gaz. degli Ospedali e delle Cliniche*, 1900, No. 26.

² *Centralbl. f. innere Med.*, Feb. 9, 1901.

lowest figures found were 67.8, the highest 75.7. He also found that in cases in which the right side of the heart showed marked fatty change and the left much less marked change, the iodine figures for the fat on the two sides of the heart were practically identical. As a result of this he concludes with even more emphasis than before that the fat found in these cases is **mere infiltration fat** obtained from fat deposits in the body. He believes that the microscopic picture confirms this view, and that nothing can be seen by the microscope that indicates anything but a gradually increasing deposit of fat which finally destroys the special tissue of the organ.

F. W. F. Ross,¹ in a discussion of the medicinal and dietetic treatment of **heart-failure in the aged**, states that he considers it exceedingly important to provide not only drugs for these patients, but the proper amount of easily assimilable proteid food to supply the tissue waste of the heart-muscle. He has given these patients muscle albumin in addition to cardiac tonics, with very successful results. He believes that the heart, more readily than any other organ, can undergo repeated metabolic restoration of tissue loss if it has sufficient material of the proper kind. The albumin which he used is obtained by extracting raw minced steak with a 5% solution of sodium chlorid and then precipitating it with acids. This gives a tasteless preparation, which can be introduced in large quantities into other food preparations. Ordinary beef teas or extracts he thinks are rather harmful than otherwise, as they tend to increase the tissue break-down and have no value as tissue producers. Gastric fermentation he finds is largely controlled by the use of malted foods and the administration of food preparations which are easily digested.

A. Hoffmann² reports a case that occurred in a man in which the chief symptoms were prolonged anemia and general weakness, with which there was for a long time a regular arrhythmia of the heart, two normal pulsations being followed by a pause. Later the intermissions became more infrequent, the heart showed no objective changes, but the patient became subject to attacks of unconsciousness which lasted for hours, in which the pulse and cardiac power showed marked changes. The pulse was extremely slow and irregular, the heart produced only infrequent strong pulsations, the intervals being occupied by weak obscure tones. The case was considered one of **Adams-Stokes' disease**. Hoffmann discusses the cause of the intermission of the pulse and of the bradycardia by observations of the heart with the fluoroscope and studies of the sphygmogram, and ausculting the heart. He reached the conclusion that the teaching of Wenckebach, that the intermissions are due to ineffectual contractions, is true in this case. From the fluoroscopic observations it seemed that the auricles made an attempt at contraction, but the ventricles were perfectly quiet. The cause of the imperfect cardiac action, as well as the slowness of the pulse, was probably to be found in disturbance of circulation or nutrition of the vagus center. In bradycardia he believes that the vagus center becomes irritated, in tachycardia is

¹ Brit. Med. Jour., Oct. 13, 1900. ² Zeit. f. klin. Med., Bd. XLI, H. 5 u. 6.

partially paralyzed. This is not necessarily due to any organic cardiac or central nervous disease. In the case reported it seemed to be purely the result of anemia, as proper care of the patient and the administration of large quantities of oxygen largely improved his condition and caused the disappearance of the attacks. Hoffmann believes that oxygen may be used with much satisfaction in similar cases.

Angina Pectoris.—Gilbert and Garnier¹ believe that all angina is of **toxic origin**, being a toxic neuralgia or neuritis of the cardiac plexus.

Loewenfeld² discusses the nervous **manifestations in the brachial plexus** in cases of angina pectoris. These may be of various sorts, either sensory, motor, or vasomotor. The distribution is generally along the inner side of the upper arm to the front of the forearm, ring-finger, and little fingers, and the ulnar side of the hand. Among the vasomotor symptoms, pallor and coldness are noted; among the motor symptoms, slight weakness. These symptoms generally come on during a paroxysm, and their severity may be prolonged to the severity of the attack. Sometimes they precede the paroxysm, and not infrequently they remain wholly or in part after the painful seizure is over. Brachial and the cardiac symptoms may thus occur independently, though they act upon each other. It is difficult to understand attacks which begin in the arm or in which the pain in the arm predominates if the customary explanation that the brachial symptoms originate in the cardiac plexus is to be accepted. He himself found in one case atrophy or sclerosis of the brachial plexus, and concludes that there was primarily an independent disease of the brachial plexus to which the angina was consecutive. He thinks that angina may begin either in the cardiac or the brachial plexus.

A. A. Eshner³ describes a case of angina pectoris which occurred in a man of 30 who had **no organic disease of the heart or vessels** that could be demonstrated. The patient, however, had had rheumatism, and this disease had very possibly caused changes in the myocardium and coronary arteries.

T. Schott,⁴ in discussing the origin and treatment of angina pectoris, attributes the disease to sclerosis of the coronary arteries, and a consequent reduction in the nutrition and energy of the heart. He does not think that any condition of the circulation is characteristic of the onset of angina, of the attack itself, or of the condition after the attack. For the relief of pain Schott advises the use of a **hot-water bag** which is moved rapidly about over the chest. The water should be at a temperature of 140° to 170° C. This often reduces or entirely overcomes the pain. The iodid of sodium is often useful in the attacks. The heart should be stimulated between the attacks. Baths and gymnastic treatment he considers useful.

C. Steele⁵ describes a case of angina pectoris in which he used

¹ La Presse Méd., Oct. 13, 1900.

² Münch. med. Woch., Aug. 7, 1900.

³ Jour. Am. Med. Assoc., Aug. 11, 1900.

⁴ Lancet, Sept. 8, 1900.

⁵ Brit. Med. Jour., Dec. 1, 1900.

oxygen inhalations with the result that the attacks had been controlled for 6 weeks, an unusually long time for this case.

Dilation.—Wolffhügel¹ discusses the most important etiologic factors in the production of **idiopathic dilation** of the heart in infectious diseases and obesity. In some cases hypertrophy occurs first; in others, dilation occurs without hypertrophy. He believes that it is impossible to tell, when dilation is present, whether a slight hypertrophy had preceded this. He thinks that acute dilation from over-exertion is extremely rare. The actual conditions in cases of this kind are, in his belief, usually muscular weakness of the heart and overtaxing of this weak organ. He particularly discusses the condition in soldiers, and thinks that constricting uniforms, trying marches, etc., are the main factors in causing the cardiac dilation. Those who suffer usually show a history of previous infectious diseases, particularly influenza and rheumatism. One of the most important causes is marked increase in arterial pressure, which in soldiers is usually caused by the excessive muscular exercise and by dyspnea. The author believes that there are two forms of insufficiency of the auriculoventricular valves; the one is regulatory and the other asthenic. He believes that with the regulatory form dilation of the orifice is very common and is a frequent cause of accidental murmurs.

Hirsch² discusses the **relation between the heart-muscles and the muscles of the body**, and the influence of this relation upon hypertrophy of the heart. He decides that the various portions of the heart may hypertrophy entirely independently of each other. Hypertrophy occurs in arteriosclerosis, he thinks, only when the aorta or neighboring branches above the diaphragm or when the blood-vessels of the splanchnic viscera are involved. If there is renal disease, there is generally hypertrophy of the entire heart. Obliteration of the pericardium alone does not, he thinks, cause any distinct cardiac hypertrophy. Hypertrophy of the left ventricle does not occur in mitral stenosis. If hypertrophy is seen in this condition, it is due to coincident regurgitation. The auricles hypertrophy in mitral stenosis and in tricuspid regurgitation. In pulmonary disease the right heart hypertrophies, as it does in cases of kyphoscoliosis; in the latter condition the hypertrophy of the left ventricle is about proportionate to the degree of deformity. With marked right-sided hypertrophy there is often some atrophy of the left side, which Hirsch considers to be due to diminution of the work required of the left side of the heart as a result of the chronic venous congestion.

Hypertrophy.—H. Kohn³ describes the case of a child which was brought into the clinic in a moribund condition, and died after about 2 hours. The necropsy showed markedly enlarged **thymus gland, which had caused pressure** of the aorta. The heart was found hypertrophied and dilated. The conclusion was reached that the

¹ Münch. med. Woch., No. 41 u. 42.

² Deut. Arch. f. klin. Med., Bd. LXVIII, H. 1-4.

³ Deut. med. Woch., Jan. 10, 1901.

thymus had actually, in this case, caused heart-failure through compression of the aorta and the extra strain upon the heart. There has been much discussion as to whether pressure of the thymus ever causes death in this way. Kohn believes that it could not be doubted in this case.

Huchard ¹ reports a case under the title of **false cardiac hypertrophy**. It occurred in a boy of 16 who had marked cardiac palpitation and was easily fatigued. He had been considered to have cardiac hypertrophy; it was observed, however, that his chest was ill-shaped and the diameters were abnormally small, and Huchard considers that in this case and other similar cases, while the heart appears both subjectively and objectively to be hypertrophied, it often is not so, but is merely relatively larger as compared with the intrathoracic space. The unusual resistance against the cardiac action, however, may ultimately result in hypertrophy. It is important to recognize the condition, as treatment should consist chiefly in gymnastic exercises intended to produce enlarged chest capacity, a treatment which is directly opposite to that which should ordinarily be used in true hypertrophy.

Aneurysm of the Heart.—J. Daland ² describes a case of aneurysm of the heart with **thrombosis of the left coronary artery**, the thrombosis being found below the left interventricular branch. There was an aneurysmal dilation of the wall of the left ventricle. The patient had a syphilitic history and had been a chronic alcoholic, but had been in his usual health up to the time of the onset of grave symptoms. He was one morning found unconscious and very cyanotic; the heart-sounds were indistinguishable. He soon became semiconscious and rose from the bed, but lapsed into unconsciousness again after a few moments; he rapidly regained consciousness after this, but had repeated attacks of syncope. Pulse beats, 25 to 30 in a minute, could be detected, but the cardiac sounds were not audible. The surface of the body was very cold. He died about 20 hours after the onset of the attack.

Rupture of the Heart.—W. D. Wiggins ³ describes the case of a man of 56 who had **ulcerative endocarditis**, which terminated fatally by rupture of the heart. On the seventeenth day after his admission to the hospital, when the temperature had become normal, there was a sudden access of dyspnea, and the man became unconscious. The cardiac dullness became much widened, the sounds could not be heard, and the pulse was not palpable. This condition lasted for 3 days, and the man died after marked rise of temperature. Necropsy showed atheroma of the aorta, with recent endocarditis, and rupture of the heart directly beneath the base of the aorta. Wiggins thinks that the rupture undoubtedly occurred 3 days before death.

Functional Disturbances.—H. J. Campbell ⁴ describes as the "**hill heart**" a condition of the heart in men, usually of the working classes, who are often given to overeating of indigestible food, while at the same time working hard and being obliged to climb hills frequently.

¹ Jour. de Méd., July 10, 1900.

³ Brit. Med. Jour., Nov. 3, 1900.

² Phila. Med. Jour., Nov. 10, 1900.

⁴ Lancet, Sept. 8, 1900.

The result is usually some cardiac hypertrophy and slight gastrectasia. If alcohol is used, the condition is likely to become more pronounced. The management of such a condition consists chiefly in careful restriction of the diet. Campbell recommends that the meals should be taken without fluids, small quantities of fluids being drunk between meals. The heart's work should be diminished as far as possible. He has had good results in the use of spartein sulphate as a heart stimulant.

H. Hochhaus¹ has made investigations of the blood-pressure in cases of **cardiac neuroses** in order to determine whether any points of diagnostic value could be drawn from an observation of the blood-pressure. As a result, he states that he found the blood-pressure, when using the Gärtner or Riva-Rocci instrument, almost regularly high; it varied between 160 and 190 millimeters of mercury in men, and between 150 and 170 in women. This is of some diagnostic importance, as the blood-pressure in organic cardiac disease is in the majority of instances low. It is of even greater importance, however, in prognosis, since a persistent increase of blood-pressure indicates an almost inevitable ultimate organic change in the heart and arteries. Several authors have already pointed out that the arteriosclerosis is a common result of persistent increase of blood-pressure, and Hochhaus thinks that this is unquestionably to be expected in many cases of cardiac neurosis. The cause might rationally be considered to be more energetic action of the heart or abnormal contraction of the vessels. Both are undoubtedly active in some instances, but in Hochhaus' opinion increased energy of cardiac contraction is chiefly responsible. He bases his belief upon the results from his use of the fluoroscope. With the latter instrument he found that the heart contracted with great rapidity and more completely than is normal. In treatment he recommends the use of very small doses (about $\frac{1}{4}$ grain) of digitalis in combination with quinin. He has been unable to observe the abnormal movability of the heart-dullness which has been described by Hoffmann as characteristic of cardiac movements.

Hochhaus² says that the **determination of the blood-pressure and the use of the fluoroscope** are aids in making the usually difficult diagnosis of functional heart-disease. In 31 cases out of 36 cases of heart neuroses examined, he found a considerably elevated blood-pressure by means of the Riva-Rocci instrument. The blood-pressure was equal to 150 to 210 millimeters of Hg. In suitable cases the fluoroscope showed a remarkably energetic heart contraction. The writer advises digitalis in small doses (centigram).

Changes in Rhythm.—P. C. Fenwick³ considers that the **tachycardia** which is seen after typhoid fever is due to disturbance of the sympathetic produced in the superior mesenteric plexus and reflexly transmitted to the cardiac ganglia. These two plexuses are closely connected, and the former supplies the portion of the intestine which is chiefly involved in typhoid fever. [It is highly probable that the tachy-

¹ Deut. med. Woch., Nov. 1, 1900.

² Wien. med. Woch., Oct. 27, 1900.

³ Lancet, Aug. 11, 1900.

cardia is chiefly due to the severe exhaustion consequent upon so prolonged and serious a disease and to the direct action of the toxins upon the cardiac tissues during the long period of infection.]

J. M. Patton ¹ describes 3 cases of **paroxysmal tachycardia**. In the first, a woman of 50 had attacks which increased in frequency and severity, and had produced decided dilation of the heart. The change in the heart advanced, until at the end of 3 months the condition proved fatal. In the second case also a fatal result is recorded, angina pectoris developing in the latter part of the affection. This patient had arteriosclerosis. In the third case, during convalescence from typhoid fever, a man of 50 showed tachycardia, with a pulse-rate of 260. This patient recovered entirely. Patton considers the prognosis unfavorable in cases that show a decided tendency to recurrence. The pathology of the condition is indefinite. The treatment should be largely symptomatic.

Careful observation of the **behavior of the secretion of urine** (polyuria with a lowered blood-pressure) before, during, and after attacks of paroxysmal tachycardia, consideration of the nervous symptoms, migraine, differences in the pupils, and the gastric phenomena compel Hoffmann ² to consider these attacks due to some central lesion analogous to that of epilepsy. The mechanism of these tachycardial paroxysms, which can appear in many pathologic conditions, is to be explained as a continuous series of extra systoles, caused by an increase of the irritability of the heart-muscle, arising from an extracardial heart center, or by an increase of motor stimulation.

Floersheim ³ finds suprarenal capsules useful in **the treatment of irregularity** of the heart, and in increasing the course and quality of the heart-sounds. There was very little influence noted when the heart action was strong and regular.

Mountain Sickness.—E. Aron ⁴ has studied the question whether the illness occurring in rarefied atmosphere is due to physical causes or to a reduction in the amount of oxygen. In investigating animals he found that the amplitude of respiration was reduced, and that there was also a reduction in the amount of oxygen taken in. He therefore decided that there were two causes producing the conditions—physical and chemie. The use of oxygen inhalations caused the amplitude of respirations to reach the normal, but the complete normal was never reached, hence providing oxygen does not entirely overcome the trouble. He recommends, however, that oxygen be carried on the trains and kept in the stations of railroads passing over high altitudes.

Tuberculosis of the Heart.—W. Eisenmeyer ⁵ contributes an interesting report concerning tuberculosis of the heart-muscle. It is well known that this is a rare localization of tuberculosis, and there seem to be but 36 cases reported. In this location the disease runs a chronic mild course. The infection is carried in the lymph-channels. **Two new cases are reported**, the first of which showed severe ascites

¹ Jour. Am. Med. Assoc., July 7, 1900.

² Wien. med. Woch., Oct. 13, 1900.

³ N. Y. Med. Jour., Oct. 6, 1900.

⁴ Zeit. f. klin. Med., Bd. XLII, H. 1 u. 2.

⁵ Zeit. f. Heilk., Bd. XXI, H. 2.

with moderate general edema, small, frequent, and irregular pulse, cardiac enlargement, reduplication of the second pulmonary sound, and a weak, irregular murmur over the mitral area. Death occurred in collapse. The postmortem examination showed old pericardial tuberculosis with complete adhesion. In the right ventricle was a mass the size of a lemon, which proved to be tuberculous. The pericarditis had not been diagnosed. Eisenmeyer directs attention to the fact that this case showed the symptom-complex which Pick terms pericarditic pseudocirrhosis of the liver; he objects, however, to this name. The murmur heard during life he attributes to a narrowing of the auriculo-ventricular opening by the mass. In the second case there was advanced disease of the lungs. There were dyspnea, edema of the legs, irregularity of the pulse, but no cardiac murmurs and no signs of pericardial synechiæ, but later there was a distinct pericardial friction. There were a number of attacks of severe collapse with the appearance of edema of the lungs, but these symptoms rapidly gave place to a return of complete comfort. These attacks furnished a striking feature of the illness. The necropsy showed advanced tuberculosis of many of the organs, complete adhesion of the pericardium, with large caseous masses in the walls of both auricles and on the conus of the pulmonary artery. One point of clinical interest was the occasional appearance of a broad band of marked dullness in the left thorax next to the heart; this was accompanied by marked increase in the severity of the general symptoms, but the general symptoms soon disappeared, sometimes within half an hour. The cause of this temporary dullness appeared to be a total adhesion of the left lung with occasional severe edema of the lung; the fibrous tissue was found at the postmortem examination to be as thick as one's finger, chiefly from the fluid contained therein. The changes in the percussion note seemed to be due to changes in the grade of this edema. Eisenmeyer directs attention to the fact that the clinical symptoms of tuberculosis of the heart-muscle are very uncertain, and that the condition has **never been diagnosed during life**. He thinks that it might be suspected if pericardial tuberculosis were considered to be present, and, with this, repeated attacks of very evanescent collapse occurred. And if with such signs there are weak endocardial heart-murmurs which vary greatly in their phase and intensity, the diagnosis would be more secure.

Moser¹ discusses tuberculosis of the heart and refers to 2 cases that have been previously overlooked. He adds a new case of his own which occurred in an elderly man with generalized tuberculosis. At the apex of the right ventricular cavity there was a firm yellow thrombus adherent to the myocardium. Sections showed that it had evidently begun as subendocardial tubercles which had coalesced. The endocardium was replaced by a rather thick layer of fibrous tissue on which rested a thrombus into which fibrous blood-vessels and tissues were growing. Tubercle bacilli were demonstrated in the microscopic section. Analysis of the literature shows that tuberculosis of the heart-

¹ Boston City Hosp. Rep., 1900.

muscle may occur at any age, though it is much more common in children under 14 years of age. It is almost always manifestly **secondary to generalized tuberculosis**, and the supposed primary cases are therefore open to some doubt. Of 53 cases, the lesions occurred 12 times in the right auricle, 13 times in the right ventricle, 8 times in the left auricle, and 20 times in the left ventricle. Moser's case adds another to the last group. The most frequent form of the disease is that of a large solitary tubercle. Miliary nodules, sclerotic myocarditis, and diffuse tuberculous infiltration are other varieties.

Hydatid Disease of the Heart.—A. J. Wood ¹ reports a case of hydatid disease of the heart. He states that Thomas, in his book on hydatid disease, said that up to the time of that publication, in 1884, there were 48 cases, of which 26 occurred in males and 18 in females, the sex not being stated in the remaining 4. The present case was in a man of 28, a worker in a flour mill, who had been in good health up to the time of his sudden death. He was riding a bicycle down a gentle slope when he suddenly fell forward, toppling over toward the left. A bystander ran to his assistance, but after a few gasps the man died. He had had no evidence of illness during the 8 previous years, except an attack of influenza. During the 7 months prior to his death he had complained somewhat of pain in his back and had been advised against bicycle riding, but he had never had shortness of breath or any cardiac symptoms. The autopsy discovered a much enlarged heart, the heart within the pericardium occupying the greater part of the chest, so that the lungs were not visible on opening the thoracic cavity. The pericardium was adherent, but was easily detachable. A white patch showed through the pericardium toward the base on the left side, and when the membrane was removed at this point, a small daughter cyst escaped from a larger mother cyst in the wall of the left ventricle. On removing the heart about a **dozen daughter cysts** escaped. The whole organ weighed 28 ounces. The lungs were compressed and collapsed. The liver had one retrograding cyst the size of a large walnut. A second smaller cyst was found adherent between the liver and duodenum. The rest of the organs were healthy.

DISEASES OF THE ARTERIES.

Methods of Examination.—K. Hirsch ² has compared the **sphygmomanometer** of Basch to the **tonometer** of Gärtner with reference to their applicability in clinical work. The tonometer does not give the absolute blood-pressure, but rather the blood-pressure plus the pressure exercised by the pressure of the soft parts on the walls of the blood-vessels. The figures obtained cannot, therefore, be compared with figures obtained in other individuals or with other instruments. Further, all local irritations which might increase the tissue resistance without affecting the blood-pressure are capable of changing the readings. Care

¹ Intercolonial Med. Jour. of Australasia, Mar. 20, 1901.

² Deut. Arch. f. klin. Med., Bd. LXX, No. 3 u. 4.

must be taken that the ring fitted to the finger is accurately applied and fits accurately. He does not regard the instrument as useful in daily clinical work, whereas the sphygmomanometer has proved very valuable in his hands. He is careful to indicate that the figures obtained with the latter instrument do not give the actual blood-pressure, but rather the blood-pressure plus an insignificant figure indicating the amount of resistance of the arterial wall. How much this may amount to in millimeters of mercury is uncertain. Investigations by different observers have given very different results. In using the sphygmomanometer, he recommends that the pressure bulb be applied to a vessel and compressed until the pulsation in the vessel ceases, then the pressure should be released until the pulsation becomes palpable and this point taken as the reading. He believes that the sense of touch will more readily detect a beginning pulsation than the termination of such.

Shaw¹ recommends the tonometer of Gärtner as the most useful instrument for **determining the blood-pressure clinically**. This instrument consists of a pneumatic ring, a mercury manometer, a rubber ball, and a rubber tube. The ring made of metal is lined on the inside with thin rubber, making it air-tight. The column of mercury registers the pressure in the ring. In applying the register the finger is rendered anemic and the instrument applied with sufficient pressure to maintain a collapsed condition of the vessels. The pressure is gradually reduced until the moment the finger becomes congested, when the pressure is read, thus giving the amount of arterial pressure. While it is admitted that this instrument is not perfect, it is claimed by the author and others that the results are as good as can be obtained by any clinical method. Jellinek found the normal blood-pressure in 532 soldiers between 100 and 160 millimeters. Various other investigators who have used the instrument report their results in a variety of diseases, and testify to the usefulness of this instrument in clinical work.

G. Gärtner,² after further study of the tonometer, decides that the values obtained by this instrument are practically the absolute values of the average blood-pressure. The **variations in the readings** at different times in the same individual indicate actual variations in the blood-pressure in the individual examined.

Schüle,³ after a series of **studies of the blood-pressure** with Gärtner's tonometer, decides that the blood-pressure is increased by arteriosclerosis, chronic nephritis, neurasthenia, and emotional conditions, and, according to the statements of some authors, by cold baths and moderate physical exercise; anemia, various cachexias, fever, and acute heart-failure lower the pressure. He does not consider the determination of the blood-pressure by the tonometer to be of much diagnostic value at present, but it promises to be more useful in the future. [It is questionable whether any results of much real value, even in clinical work, can be obtained from this instrument or any other now used for the same purpose. The readings obtained are merely approximate and vary

¹ Med. News, Mar. 9, 1901.

² Münch. med. Woch., Aug. 28, 1900.

³ Berlin. klin. Woch., Aug. 13, 1900.

considerably for the same individual at different times and when taken in different regions. Gross changes can be determined fairly satisfactorily, but the results when less marked alterations are present are often very unsatisfactory.]

Atheroma.—A. Brion¹ describes a case of marked atheroma in a girl of 15, who had for 10 years been the subject of attacks of muscular rheumatism. There was marked stenosis of the mitral, insufficiency of the aorta, and in the posterior mitral leaflet an atheromatous cavity was found which was filled with fat, some calcium crystals, and compound granulation cells.

Aneurysm.—P. Hampeln² discusses the **diagnosis of aortic aneurysm** and of mediastinal neoplasms, basing his remarks upon an experience with about 150 cases of aneurysm, about 200 cases of stenosis of the esophagus, and a series of other cases of mediastinal neoplasm. He considers a marked difference in the two radial pulses to be a sign distinctly indicating aneurysm rather than neoplasm. It occurs much more commonly in the former condition than in the latter. The most important signs of either condition are those of stenosis and of pressure paralysis, the latter chiefly affecting the recurrent nerves. **Tracheal stenosis** speaks with much probability of the existence of an aneurysm of the aorta or one of the large vessels. Of 20 cases of tracheal stenosis, 18 were due to aneurysm and 2 to neoplasm. The stenoses of the bronchi are much more difficult to demonstrate, and are also of less importance, as they occur in about the same percentage in neoplasm as in aneurysm. Stenosis of the esophagus is one of the most important symptoms that one can discover; if it is a permanent stenosis and evidently due to organic cause, it indicates almost with certainty, in his opinion, the existence of a neoplasm. In his experience with aneurysm he has seen but one case in which distinct signs of permanent stenosis of the esophagus developed; 4 other cases were shown postmortem to have had compression of the esophagus, and in 3 of them there was perforation, but there had been an absence of symptoms, or only slight evidences of stenosis. Subjective symptoms of a moderate degree of stenosis may, however, be observed in a considerable percentage of cases of aneurysm, but the signs of actual stagnation in the esophagus do not develop, because the esophagus is merely pressed to one side and is not actually stenosed to any marked degree. Paralysis of the recurrent nerve may occur in either condition in about the same percentage of cases. If it is seen in persons of middle age, particularly when there is a syphilitic history, it is more probably due to aortic aneurysm; and on the contrary, if it is seen in older persons, particularly if there is any cachexia, it is an indication of neoplasm.

E. Gebauer³ considers that the **use of the x-rays** is not sufficient to establish absolutely a differential diagnosis between aneurysm of the aorta and intrathoracic tumor. In the case reported and illustrated in this paper the diagnosis between aortic aneurysm and intrathoracic tumor was

¹ Virchow's Arch., Bd. CLXII, H. 3. ² Zeit. f. klin. Med., Bd. XLII, H. 3 u. 4.

³ Deut. med. Woch., Aug. 30, 1900.

in doubt. Examination by the x-rays, however, showed an abnormal shadow with an apparently expansile pulsation, and it was decided that the case was one of aneurysm. The autopsy showed that it was a carcinoma of the esophagus with a communicating abscess-cavity which was adherent to the aorta. Pulsation of the aorta gave the appearance of expansile pulsation of the mass. The patient had also presented tracheal tug, the explanation for this being the adhesion between the aorta and the mass on the one hand and the trachea on the other.

Levy-Dorn¹ also expresses the same opinion concerning the **diagnosis of aortic aneurysm by the x-rays**. He states that the normal pulsations of the aorta in case tumor is present give rise to the appearance of expansile pulsation of the tumor, and confusion with aneurysm is almost impossible to avoid, even with any method of use of the x-rays. He gives an elaborate discussion of the most practical methods of using the x-rays for the examination of the chest, and describes an instrument which he has made for marking out areas seen during the examination. It consists chiefly of a stylographic pencil with an attached rubber bulb which is filled with methylene-blue. The areas are outlined by expressing the stain along the edge of the shadow as one looks through the fluoroscope. In examination of the lungs full inspiration is considered most satisfactory except when examining the apices. In the latter case the clavicles cover the apices during full inspiration; hence only moderate inspiration is best in this case.

H. Walsham² reports a series of cases in which the **x-rays** were used to confirm a diagnosis of **aortic aneurysm**, or in which the aneurysm was first definitely determined to be present by the use of the x-rays.

G. Cocorullo³ discusses **rhythmic shocks imparted to the head** in cases of aneurysm. It is commonly thought that these rhythmic shocks occur only in aneurysms of the arch of the aorta, but in the case reported, a man of 36, the symptom was observed in a dissecting aneurysm of the right subclavian and first part of the axillary arteries. The man had exhibited asynchronism of the radial pulses with an area of dullness high up in the chest and toward the right. The head movements were vertical and rotatory. The cause of these symptoms in aneurysm of the arch is the jerking downward of the right bronchus and trachea, thus producing a nodding movement, while in cases of involvement of the large branches of the aorta the movements are the result of the jar on the costal attachment of the scalene muscles and of the sternomastoid, the movements in these cases being usually rotatory.

Jessen⁴ reports one case of aneurysm of the aorta, which was adherent to the trachea, and in which there was nevertheless **absence of tracheal tugging**, and also another case of **sarcoma of the mediastinum**, which had become adherent to the aorta, trachea, and left bronchus, and in which **tracheal tugging was present**. After a consideration of these cases and of other similar ones Jessen decides that

¹ Deut. med. Woch., Aug. 30, Sept. 6 and 13, 1900.

² Lancet, Nov. 3, 1900.

³ Il Policlinico, Nov. 24, 1900.

⁴ Münch. med. Woch., 1900, No. 45.

tracheal tugging is of no importance in differential diagnosis between aortic aneurysm and mediastinal tumor. [This is, however, a very radical statement of the case. Tracheal tugging is not pathognomonic; nor are most physical signs at all pathognomonic. Nevertheless, tracheal tugging is so common in aneurysm and so relatively rare in other conditions, that it is one of the signs which speak distinctly in favor of aneurysm.]

Alfred Stengel¹ reports a case of aneurysm of the arch of the aorta which **ruptured into the superior vena cava**. The patient, a young man of 30 years, a teamster, who had suffered no special cardiac or circulatory symptoms, excepting slight shortness of breath, was suddenly seized while at work with dull pain in the chest and a choking sensation. He began to swell about the face and neck and to grow cyanosed. Later the evidences of obstruction of the superior vena cava—swelling, cyanosis, and ecchymoses of the upper half of the body with normal conditions below—became more marked. On physical examination a murmur having the characteristics of a venous bruit was heard to the right of the sternum. It was continuous, but increased during ventricular systole. The diastolic portion was long and vibrating in character; the systolic, short and rather harsh. Excepting for the humming character, the diastolic sound might have been an aortic regurgitant murmur. It was, however, transmitted to the right as far as the right axilla and scarcely at all to the left or to the apex. In considering the diagnosis it was evident that some form of obstruction of the superior vena cava existed, and it was also evident from the area of dullness and pulsation that there was an aneurysm. The only difficulty was the determination of the cause of the obstruction; *i. e.*, whether it was due to the occurrence of rupture of the aneurysm into the vena cava, to the development of a thrombus at a point of compression of the vena cava by the aneurysm, or to the sudden dilation of the aneurysmal sac with complete occlusion of the vein. The character of the murmur made the first of these three seem quite evident and autopsy confirmed the result.

C. Doppe² reports a case of **compression of the superior vena cava** by an aortic aneurysm. There was a gradual increase in the volume of the neck, with congestion and bloody appearance of the face and skin, and the thorax showed an increasing dense edema; the veins at the lower portion of the thorax became prominent and somewhat varicose, and there was edema and cyanosis of the upper extremities. There were pains about the back, attacks of vertigo and of suffocation, with dysphagia and dysphonia. There were some signs of compression of the right bronchus. There was a pulsation on the right side of the manubrium, and some prominence at that point. Murmurs and thrills were absent, and the radial pulses were equal and synchronous. The case was thought to be an aneurysm of the aorta, causing compression of the superior vena cava, of the right bronchus, probably of the right pneumogastric nerve and the left recurrent laryngeal nerve. Examination by the x-rays showed the presence of an aneurysm.

¹ Am. Jour. Med. Sci., Jan., 1900.

² Rev. de Méd., Sept. 10, 1900.

C. Höldmoser¹ reports a case of aneurysm of the ascending aorta which **perforated into the pulmonary artery**. The perforation had a diameter about the size of a large pea, the edges were firm and fibrous, and the perforation had apparently existed for a long time. The most notable signs during life had been cough, dyspnea, a pulsation most marked along the left side of the sternum in the second intercostal space, a marked thrill in this area, and a loud systolic murmur best heard over the region mentioned; there was a diastolic murmur in the early period of observation, but this disappeared. There were signs of dilation and hypertrophy of both sides of the heart, but they were much more marked on the left. The pulse was decidedly quick. It was thought during life that the case was one of aneurysm of the ascending aorta accompanied by mitral insufficiency because of a systolic murmur at the apex, and it was believed that the diastolic murmur was produced in the aneurysm itself. Postmortem examination, besides showing the condition mentioned, demonstrated that the aortic valves and orifice were entirely normal. The cause of the diastolic murmur remained obscure. There was adhesion of one of the pulmonary valves to the wall of the pulmonary artery, and Höldmoser claims that this did not allow of pulmonary regurgitation, because he believes that the aneurysm compressing these valves toward the opposite side of the artery probably prevented pulmonary regurgitation. Aneurysm of the pulmonary artery had been thought of in this case, and he discusses the diagnosis of this condition, reaching the conclusion that in most cases it is practically impossible to establish such a diagnosis. The diagnosis of compression or perforation of the pulmonary artery may be made with a certain degree of probability, however, by the existence of signs similar to those seen in this case, their situation being the most characteristic point. One would expect marked hypertrophy of the right heart, but it has certainly been absent in a number of similar cases reported. There are at least 7 cases of perforation of aortic aneurysm into the pulmonary artery on record, in which the perforation was found at the time of autopsy to be old. There are no characteristic signs of perforation, the signs evidently depending largely upon the size of the perforation.

Clarke² reports a case of varicose aneurysm of the aorta **communicating with the pulmonary artery**. This occurred in a man of 36 who was taken suddenly with dyspnea and palpitation. There was a loud whirring sound over the left side of the chest, besides distinct systolic and diastolic murmurs. Shortly before death there was marked decrease of the urine excretion, with orthopnea and the occurrence of anasarca. Cyanosis was not present. The autopsy showed a thin-walled aneurysm of the aorta about the size of a hen's egg, which arose just above the aortic valves, and which communicated with the pulmonary artery by a large perforation.

A. P. van Spanje³ reports a case of aneurysm of the descending thoracic aorta, **with spurious spondylosis**. The dorsal portion of

¹ Zeit. f. klin. Med., Bd. XLII, H. 3 u. 4.

² Brit. Med. Jour., Dec. 15, 1900.

³ Nederl. Tijdsch. voor Geneeskunde, 1900, Jaarg. 2.

the spine was maintained constantly in a stiff, erect posture, lower lumbar lordosis was absent and there was instead kyphosis, and in bending forward and in other bodily movements it was evident that there was complete immobility of the spinal column with atrophy of the muscles along the spine. There was no change in any of the joints of the extremities. The patient died from perforation of the esophagus, and the autopsy showed that there was an aneurysm which had caused erosion of the vertebrae, and the stiffness of the spinal column was evidently due to contractures of the muscles along the spine. There was no ankylosis.

E. Fast¹ reports a remarkable case of aneurysm of the aorta, in which a sign like that recently described by Leyden was observed. The man had the usual signs of aneurysm of the abdominal aorta near the diaphragm. There was a **loud metallic diastolic murmur** heard beneath the xiphoid, becoming less intense as the stethoscope was carried toward the aortic region. The murmur was considered to be due to the aneurysm, and the postmortem examination confirmed this view. The aortic valves were absolutely competent. The murmur was thought to have been due to the narrowing of the aorta just above the aneurysm, and to a backward flow of blood through this narrowed point. It is an interesting fact that the necropsy showed a large retro-peritoneal hematoma which was not diagnosed during life; there had been no signs of acute anemia, and the patient had been kept under morphia, so that this drug had covered any pain or other signs of peritoneal irritation. Another interesting observation was the fact that pressure on both femoral arteries caused the diastolic murmur to become very much louder.

A. E. Maylard² reports a case of abdominal aneurysm which pointed posteriorly, and which in the early stages gave rise to **symptoms of chronic colitis**. The patient was a man of 35, who had suffered for about 18 months from constipation and the passage of mucus and flakes of lymph-like material; in the latter months there was pain, chiefly situated about the eleventh and twelfth ribs on the left side, and in the epigastrium. The sitting posture always caused the pain to become more severe. A pulsating tumor, evidently an aneurysm, appeared suddenly in the lower dorsal region near the spine; this had evidently given rise to the condition by pressure upon the nerve-trunks and upon the blood-vessels of the intestines, the latter pressure causing chronic congestion of the bowel. The patient died, but an autopsy was not secured.

Treatment.—J. Sörgo³ discusses the **treatment of aneurysms and hemorrhage with gelatin**, reporting 6 cases of aneurysm of the thoracic arch, and a number of instances of hemorrhages of various kinds in which he has used this method. After discussing his own cases and the literature upon the subject, he comes to the conclusion that the use of gelatin injections subcutaneously causes deposit of clot

¹ Deut. med. Woch., Mar. 28, 1901.

² Brit. Med. Jour., July 28, 1900.

³ Therap. der Gegenwart, Sept., 1900.

in a very large proportion of aneurysms of saccular form, but that it apparently does not tend to produce coagulation in diffuse aneurysm. In a considerable number of cases of hemorrhage of various kinds the local or subcutaneous use of gelatin seemed to produce a cessation of hemorrhage. It is still a question whether the deposit of clot in the aneurysmal sac and the cessation of hemorrhage are due to the gelatin. It is quite possible that they may be merely the result of the dietetic treatment and the absolute quiet which is required of the patient. There has never yet been any real experimental evidence that the subcutaneous use of gelatin does increase the coagulability of the blood, and in a good many cases the local use of gelatin does not seem to have any hemostatic effect. The injections are without danger even if concentrated solutions are used. Sörgo somewhat cold-bloodedly states that the pains can only be looked upon as a satisfactory occurrence because they oblige the patient to keep absolutely quiet. He considers kidney affections not to be contraindications to the use of gelatin internally; but this question is still an open one as far as concerns the subcutaneous use of gelatin.

Lancereaux¹ presented a specimen of aneurysm of the ascending aorta treated by subcutaneous injections of gelatin. Rest, diet, repeated bleedings, and large doses of potassium iodid had had no influence upon this aneurysm, but after injections of gelatin the tumor—the size of a child's head—diminished somewhat in size, there was no pain, and the patient was able to pursue his usual occupation. The specimen showed the large **aneurysmal sac completely filled** by firm old clots.

N. J. Kotowtschicoff² describes a series of cases of his own and collects a considerable number from the literature, in which the symptoms and physical signs of aneurysm of the aorta disappeared largely or completely under the influence of **large doses of potassium iodid**. The chief point in his paper is that if a syphilitic history is obtained in aneurysm of the aorta it is improper to formulate so unfavorable a prognosis as is commonly given. He considers that there are many more cases of aortic aneurysm of syphilitic origin cured, or practically cured, than is generally believed, and thinks that if proper use of the x-rays and other diagnostic measures is made, the diagnosis may be established early, and the prognosis may thereby become more satisfactory in many of these cases. He insists that large doses of potassium iodid must be used.

Rupture of the Aorta.—Flörshiem and Benda³ reported to the Berlin Medical Society a case of rupture of the aorta which occurred suddenly in a glass-blower while he was at work. The patient was overcome suddenly and showed marked cyanosis, but improved so decidedly under the use of stimulants and hypodermoclysis that it was thought that he had illuminating gas poisoning. The next day, however, he died suddenly. The necropsy showed a circular rupture of the

¹ Gaz. Hebdom. de Méd. et de Chir., July 15, 1900.

² Zeit. f. klin. Med., Bd. XLI, H. 5 u. 6.

³ Centralbl. f. innere Med., Jan. 12, 1900.

aorta which had first involved the intima and media and then produced a dissecting aneurysm which had secondarily ruptured in the pericardium. The aorta showed no marked changes, but there were some sclerotic patches, and above the rupture there was a spindle-shaped aneurysmal projection which Benda thought had predisposed to the rupture in that it had produced some stenosis of the aorta and in that way raised the pressure to a very decided extent. It was thought that the man probably had as the immediate cause of his illness an illuminating gas poisoning and that this was followed by the rupture.

Congenital Narrowness of the Aorta.—Lochte¹ notes the existence of intestinal changes in 3 infants that died with hereditary syphilis. In one case these consisted of widespread atrophy of the mucous membrane and ulceration, and in another two local necroses, and in the third miliary gummas. He also states that in 2 cases, girls of 18 and 19 years respectively, he observed death from cardiac weakness, and their hearts showed advanced fatty degeneration. This Lochte attributes to congenital narrowness of the aorta, which in these cases was found to have a circumference of about 50 millimeters directly over the semilunar valves.

DISEASES OF THE RESPIRATORY TRACT.

GENERAL CONSIDERATIONS.

R. May and L. Lindemann,² after an experimental and theoretic consideration of the **origin of tympanic and nontympanic percussion-sounds**, make the statement that percussion-sound is determined in many cases by the relation between the size of the communication with the bronchial air (C) and the volume of air in the alveoli (A). In other words, the product of $\frac{C}{A}$ determines in these cases whether the note be tympanic or not. If this product sinks below a certain point, not definitely determined, the note will become nontympanic; if it is above this point, the note will be tympanic. Collapsed or compressed lung will often give a tympanic note. In such cases they believe that this theory explains the production of the tympany. Another condition in which the rule holds is in cases in which tympany is present with beginning pneumonia or with edema of the lungs. It is due then to reduction in the volume of the alveolar air and serous infiltration of the septums. In cases of pneumonic or tuberculous infiltration of the lung the tympanic note is due to the transmission of the blow to the air in the bronchi. One important factor in the production of tympany is an adaptation of the amount of air contained in the vesicles, and to the condition of the surrounding tissues the vibrations of the air and membranes should coincide with each other. The presence of a nontympanic note indicates nothing definite as to the condition of the membranes surrounding the air, because tympany is dependent upon these two factors—vibration of the air

¹ Mittheil. aus den Hamburger Staatskrankenanstalten, Bd. II, 1900.

² Deut. Arch. f. klin. Med., Bd. LXVIII, H. 1 u. 2.

contained in the vesicles and a properly adapted vibration of the tissues. A nontympanitic note, however, does indicate with some probability that the volume of air in the alveoli has not yet sunk far below the normal value, while a tympanitic note indicates a marked reduction in the amount of air.

J. Esser¹ considers that one of the most important ways in which **disturbance of the pulmonary circulation**, and secondarily of the heart, is produced in pulmonary disease, is through alteration of the elastic tissue connecting the walls of the small blood-vessels with the walls of the pulmonary alveoli. These fibers are readily demonstrated by microscopic examination. In those cases of pulmonary disease, such as pleuritic adhesions, persistent exudates, or deformities of the thorax, in which the excursion of the lungs is greatly hindered, alterations in the elastic tissue have apparently little to do with the disturbance of circulation which results. An important factor in these cases is the interference with suction action. In two general classes of pulmonary change, however, he believes the alterations of the elastic tissue are of great importance. These are, on the one hand, general indurative processes in the lungs and emphysema, and, on the other hand, sclerotic changes in the pulmonary vessels. In the latter case the rigidity of the vessels prevents their being widened through the traction of the elastic tissue, and in the former case the pulmonary changes themselves result in a more or less complete disappearance of the elastic tissue. In either of these cases the tension in the pulmonary vessels would be much higher than the normal, and this would result in excessive strain on the right heart.

J. W. Runenberg² insists upon the value of what he calls **percussion transsonance**, which is practically auscultatory percussion. He believes that the method is only of value when the percussion is undertaken very lightly, and that an even better method than percussion is to stroke the finger tip lightly in lines radiating from the stethoscope. As one passes off the portion of skin overlying the organs ausculted there will be a marked change in the note given by the stroke of the finger.

DISEASES OF THE UPPER AIR-PASSAGES.

Seifert,³ in a general discussion of the **relations of disease of the nose to general diseases**, takes up the question of mouth breathing and its unfavorable influence upon appetite and digestion, as well as upon the upper air-passages and the upper alimentary passage; he also discusses, on the other hand, the unfavorable influence upon the upper air-passages of abnormal conditions of the digestive organs. Digestive disturbances, and particularly tumors, constipation, and abdominal distention, cause hyperemia of the erectile tissues of the nose, and frequent vomiting may produce irritation of the nose, and sometimes cause serious inflammation by the lodgment of the vomit in the nasal cavities. There

¹ Centralbl. f. innere Med., Jan. 26, 1901.

² Zeit. f. klin. Med., Bd. XLII, H. 1 u. 2.

³ Berlin. klin. Woch., Aug. 27, 1900.

may also be a relation between disease of the nose and cardiac neuroses. Anginoid attacks, irregularity, acceleration, and slowing of the pulse, and similar conditions are seen in nasal disease, and hemorrhages, coryza, and other symptoms referable to the nose are not infrequently noted in valvular disease of the heart. If epistaxis occurs in a person past 40, it is very suggestive of arteriosclerosis, and should lead to careful examination for this condition. It is also not uncommon in nephritis and in leukemia, and other hemorrhagic conditions. In anemias he describes disturbance of the sense of smell as very common. As distinctions between typhoid fever and typhus fever he mentions that epistaxis is common in the former and rare in the latter, while the contrary is true of coryza. Influenza is commonly accompanied by acute catarrh of the nose, and is not infrequently followed by abnormalities of smell, or by loss of smell. Malaria may be accompanied by disturbance of the nerves of the nasal cavities or by nasal hydorrhea. Involvement of the nose in leprosy is a well-known characteristic, and a similar condition may, of course, occur in glanders.

E. Neisser and Kahnert¹ report a **group of cases of unusual characteristics**, with close clinical and etiologic relationship, in which there was disease of the upper air-passages. They describe 5 cases, all of which had shown chronic trouble of the upper air-passages, which, while it had persisted for years, was always most severe in winter and showed decided remission in summer. Examination of these cases showed atrophy of the mucous membranes of the nasopharynx, the pharynx, and the larynx, in some cases of the trachea, and occasionally of the nose. Mucus was secreted in excess. Scars and adhesions were absent. There was therefore no clinical evidence of rhinoscleroma, and the organism of this disease was not found. The characteristics of ozena were present, but there were no evidences of syphilis, there were no bone deformities, and Abel's bacillus was absent. They found in each case bacilli which had the characteristics of **diphtheria bacilli**. These were virulent in only 2 of the cases, but the other 3 cases were found to have so much antitoxic power of the blood-serum as to give protection to animals, after large doses of diphtheria toxin, when the blood-serum of the patients was injected. The bacilli found were also agglutinated by the serum of a goat infected with diphtheria. There was an entire absence of pseudomembrane and of other clinical appearances of diphtheria. In one case diphtheria toxin in small doses was given with the idea of attempting to increase the immunity of the subject. There was some local pain and infiltration as a result of the injections, but the local conditions in the air-passages improved. Whether the improvement was actually due to the injections could not be definitely stated, as the experiment was made just at the beginning of warm weather and the patient had always shown some remission at this time.

Adler,² in discussing the cause of catarrhal conditions of the respiratory organs, states that he considers it not improbable that the fre-

¹ Deut. med. Woch., Aug. 16, 1900.

² Therap. Monatshefte, Sept., 1900.

quency of such conditions in the spring and autumn, and the occurrence of hay-cold and the catarrh of the aged, may be due to a **temporary or persisting insufficiency of the epithelium**. He thinks that the influence of climate upon the mucous membrane is not so much exercised through changes in metabolism as through its direct effect upon the mucous membrane. He thinks that dry, harsh atmosphere destroys the epithelium to some extent and gives an opportunity for the invasion of bacteria, and believes that cold pure air is of value in the treatment of these cases, as it prevents the epithelium from becoming excessively sensitive, and tends to produce a growth of more resistant epithelium.

W. Scheppegegrell¹ discusses the **prevention and treatment of "colds."** The etiology of this condition involves more than mere exposure to cold. Those who have lived out-of-doors, even though subjected to inclemencies of weather, do not frequently suffer with troubles of this sort. It is rather under the artificial conditions of city life that colds are met with. Excess of clothing is one of the conditions to which the author directs attention. All wraps, etc., should be removed on entering a warm room. The resistance of the body may be increased by cold shower baths. In a special direction the author insists on the proper cleansing of the nasal passages. Constitutional treatment, he believes, has been overdone. Among the remedies so used quinin takes the first place. He believes this drug useless as a prophylactic, though frequently the coincidence of the relief of nasal symptoms after the use of the drug is looked upon as a proof of its efficacy. A brisk saline purgation in cases of all kinds and the administration of lithia in certain gouty cases, he has found useful. In the way of local treatment he advises against cocain, which should rarely be used and never prescribed. The best local treatment is a warm 0.5% salt solution as a wash. This removes acrid secretion and soothes the mucous membrane. It is best administered as a douche.

Asthma and Emphysema.—E. Aufrecht² notes the fact that it is usually taught that the musculature of the bronchi consists of a circular layer only. He states that by using the Biondi-Heidenhain staining mixture he has been able to demonstrate the existence of a **longitudinal muscular layer**, though this is much weaker and thinner than the circular layer. It is easily demonstrated in the neighborhood of areas of inflammation of the bronchi. His explanation of asthma is based largely upon this observation. He believes that cramp of the bronchial muscles must be accepted as being the cause, but that a consecutive catarrh often contributes largely to the symptoms; this is more especially the case in cases which are of very prolonged duration. In any condition which causes a spasmodic contraction of the bronchi, the circular fibers, which are much stronger than the longitudinal, would overcome the action of the latter and this would tend to decrease the diameter of the bronchi, and there would therefore be a reduction of the lumen of the bronchi. In other conditions in which there was marked congestion or any edematous infiltration of the bronchi the

¹ Med. News, Oct. 3, 1900.

² Dent. Arch. f. klin. Med., Bd. LXVII. H. 5 u. 6.

action of the longitudinal fibers would be overcome much more quickly than that of the circular fibers, because they are much weaker; consequently any condition of inflammation or edematous swelling of the bronchial mucous membrane would tend toward the production of asthma.

E. Kingscote¹ states that primary asthma can be produced only by **dividing the vagus in the neck** and stimulating the proximal end with electricity. He considers, therefore, that the cause of asthma is some alteration in the tissues supplied by the vagi or sympathetic nerves, or a change in the nerves themselves. The physical factors present in cases of chronic asthma are vesicular emphysema, cardiac dilation, and chronic congestion of the liver. The dilation of the heart is best treated by the Schott method, while breathing exercises will control and often reduce the emphysema. These factors and the congestion of the liver must always be overcome before the patient can be cured.

Cohen-Kysper² presents a theoretic consideration of the **origin of asthma**. He states that very careful investigation of the sensations of patients subject to asthma shows that there is a half-conscious, but practically constant, sensation of dyspnea, even in periods when they are frequently free from actual asthma or any evidences of respiratory abnormalities. He believes there is excessive hyperesthesia in these patients, but instead of placing the hyperesthetic area which starts the reflex spasm in the nose or in the bronchi, he places it in the psychic centers, considering that the production of asthma occurs as follows: Either through the existence of a chronic bronchitis, stenosis of the nose or nasopharynx of slight degree, or other cause, there is produced a practically constant, though extremely slight and almost unnoticeable, feeling of dyspnea which is sufficient only to excite the psychic centers and to cause an almost or quite unnoticed feeling of dyspnea and irritability of these centers. Any factor now ensuing which tends to increase this excitability will produce a spasm of the bronchi, and thus an attack of asthma. Such factors are: acute bronchial irritation, coryza, exposure to irritating vapors, to cold air, or the various other conditions which are known to cause an onset of asthma and which in his belief are always factors which cause a little increase in an already existing dyspnea.

W. A. Wells,³ in discussing the cause, nature, and treatment of **asthma**, decides that this disease has many points of **resemblance to migraine, angina pectoris, and epilepsy**. He thinks that the vasomotor theory (arterial contraction) is the most satisfactory explanation of the disease. He considers that there is a morbid general constitutional state, chiefly affecting the sympathetic nervous system, and evidenced chiefly by the presence of uric acid and urates. Asthma is, he states, a reflex neurosis due to disease of various organs, but particularly those supplied by the vagus nerve. The most frequent cause is nasal disease, but this may be very slight and difficult to discover. There is

¹Brit. Med. Jour., Oct. 13, 1900.

²Deut. med. Woch., Nov. 15, 1900.

³N. Y. Med. Jour., Oct. 17 and 24, 1900.

in most cases of asthma a very pronounced psychic element. The treatment is best carried out by drugs which control arterial spasm, but each case should be treated individually. The general constitutional condition should be particularly investigated and treated. He considers such drugs as piperazin and iodid and alkalies, together with general tonics and careful dieting, the most successful measures.

B. Levy,¹ in a study of the **Charcot-Leyden crystals** and a comparison of them with **sperm crystals**, decides that the two differ decidedly from each other, though they are often said to be the same. The crystals from the sperm are long and prism-like in shape, with curved edges; they belong to the monoclinic system. A strong solution of iodid and potassium iodid stain them a deep brown or violet. They may be found in spermatie fluid after drying it or allowing it to stand. The Charcot-Leyden crystals, on the contrary, are stained yellow with iodin and are octahedral or hexahedral. Their position is not definitely known, but they bear some relation to eosinophilia. They are seen in asthmatic sputum, in sputum of fibrinous bronchitis, and in some other forms of sputum, in the blood in leukemia, in the intestines in infection with parasites, and in nasal polypi.

Bullara² discusses the **cause of pulmonary emphysema** with nasal occlusion. He experimented upon dogs, permanently stopping their nasal cavities (in some experiments sewing them together), and preventing any reflex action by cocainizing the nose. He was able to determine that the modification of the respiration resulting consisted in decrease of the frequency of breathing, in prolongation of inspiration, and in an increase in the depth of breathing. Hence the volume of air inspired was greater. The increased depth of breathing was due to the fact that the mouth is, in contrast to the nose, a rather narrow orifice for breathing. The emphysema was, in his belief, the result of this. As to the question whether the disease is inspiratory or expiratory, Bullara considers that both forcible inspiration and forcible expiration are capable of decreasing the elasticity of the lung tissue, because in both the lungs are stretched beyond their normal capacity and are obliged to contract more rapidly and forcibly in order to drive out the excess of air. Emphysema, therefore, with obstruction of the nose, he considers to be due purely to the mechanical results of this obstruction, and to be produced by excessive dilation of the lung through forced inspiration; the latter, as a necessary sequel, produces increase of the expiratory pressure.

F. Kraus³ reports very successful results from the treatment of attacks of asthma with a mixture of **antipyrin and caffein-sodium-salicylate**. It is very serviceable when given before the attack, and in Kraus's experience was comparable in its effects only with morphia and chloral hydrate.

A. Ehrlich⁴ has investigated the value of **oxycamphor** in doses of

¹ Berlin. klin. Woch., Aug. 13, 1900. ² La Riforma Med., 1900, Nos. 183 and 184.

³ Therap. der Gegenwart, Sept., 1900.

⁴ Centralbl. f. d. gesammte Therap., Jahrg. XVII, H. 1 u. 2.

15 to 30 grains in a series of 32 cases. It was found to be a distinct antidyspneic remedy, but varied largely in its effects. It was often observed to have a very prolonged influence, particularly in disease of the lungs, and in tuberculosis in especial. Circulatory dyspnea was, however, often most favorably influenced. In some cases it had a direct hypnotic effect. In cases of cardiac insufficiency the effect seemed to be in inverse ratio to the degree of insufficiency; when diuresis was free a pronounced effect was observed, while when circulatory stagnation was marked there was no satisfactory effect. Unfavorable collateral effects were not observed.

E. v. Kötly¹ has also used **oxycamphor**, and found it extremely valuable in many instances of **cardiac and renal disease**, in some of which other remedies had proved to be without effect, or the patient had become accustomed to other drugs and did not react to their use. In only one case of emphysema was oxycamphor without effect; in the others the dyspnea disappeared in 1 or 2 days. The effects do not show themselves very rapidly. It cannot, therefore, be very satisfactorily used in asthmatic attacks. One serious objection to its use is that it is expensive.

Foreign Body in the Trachea.—E. Wanitschek² describes the case of a boy who had a sudden attack of suffocation associated with hemorrhage from the mouth and nose. Tracheotomy showed the presence of a brass ring below the vocal cords and embedded in granulations. The boy thought that he had swallowed this over a year before; and it was found that a year and a half before the patient had been treated in the same hospital for diphtheria, and the history at that time stated that the child was said to have swallowed the foreign body mentioned. After this time it was reported that the boy had had cough and dyspnea continuously, although he recovered completely from his diphtheria.

C. Binz,³ after reviewing the previous literature upon the effect of **tea and coffee distillates** upon the respiration and heart, reports work of his own, and decides that caffein-free distillate of roasted coffee increases the respiration in man, particularly when the subjects have for some hours before abstained from food. This increase does not last long, and is due chiefly to the increase in the number of respiratory movements and not to increase in amplitude. The same effect was seen even in dogs that had been completely paralyzed with alcohol. Together with the increase in respiration there was some muscular irritability and psychic excitement. The frequency of the pulse was not altered. The distillate of a good Chinese tea showed the same effect, though less marked. This is contrary to the statement of Lehmann, that no notable physiologic effect upon the brain or muscles can be seen after taking coffee distillate even in large doses. As a general result Binz states that the chief effect of tea and coffee must be considered to be due to caffein, though the aromatic substances have some influence.

¹ *Therap. der Gegenwart*, Aug., 1900.

² *Prag. med. Woch.*, 1900, No. 31.

³ *Centralbl. f. innere Med.*, Nov. 24, 1900.

S. Floersheim ¹ reports that he has used **suprarenal gland** in the treatment of acute and chronic bronchitis, asthma, with hyperemia of the lungs, congestion and edema of the lungs, hemoptysis, and in cases of pulmonary tuberculosis, giving 3-grain powder, which was to be chewed and swallowed without water. In most cases he states that he saw relief, which was sometimes permanent, though more frequently temporary. Some enthusiasm seems to be demonstrated in the observation that the effect took place often within 2 to 15 minutes.

"Paradoxical Dilatation."—A. Brosch ² reports a curious alteration in the form of the trachea and main bronchi, which he terms paradoxical dilatation. The autopsy in the case, that of a man of 63, showed that the trachea and bronchi were enlarged and there were unusual changes of the cartilages. The latter were bent outward at their posterior ends, and the membranous portion of the bronchi was strongly stretched. The result was that the lumen had assumed the form of a lyre or a bow, the membranous part corresponding to the string of the bow. The lumen was therefore enlarged, but had become very narrow in the sagittal diameter. The patient had shown a marked costal type of respiration, and Brosch thinks that this must have been assumed because of necessity, since it would tend to hinder the sides of the lumen from falling together completely. This emphatic costal type of respiration may be of some importance in diagnosis of the condition. The condition was thought to be of neuromyopathic origin, and this was made more probable by the fact that the patient had for some time had an embolic paralysis of the right facial and the right arm, and had had occasional paralysis of the bladder.

Fibrinous Bronchitis.—Ott ³ reports a case of fibrinous bronchitis in a boy of 15. Cultures from the coagula showed on microscopic examination **pneumococci and Staphylococcus aureus**. The cause of the condition in this case was, in the author's belief, a simple catarrhal bronchitis, which was kept up and intensified by the inhalation of fine particles of metal; his occupation was that of a polisher of metal tools. The mixed infection of the pneumococcus and staphylococcus was probably favored by the irritation of the dust, and these microorganisms perpetuated the bronchitis.

PULMONARY HEMORRHAGE.

Lancereaux ⁴ discusses **neuromyopathic hemorrhages** from the respiratory passages. He describes various observations of his own and of others, in which hemorrhages from the respiratory passages were observed without signs of local disease sufficient to explain them. [A number of the cases mentioned certainly cannot be called neuromyopathic hemorrhage without more conclusive proof that organic conditions were absent. One case, for instance, is described as having occurred in an obese man of 60, who had hemorrhoids. He suddenly had a hemop-

¹ Med. Rec., Nov. 17, 1900.

² Deut. Arch. f. klin. Med., Bd. LXXVIII, H. 3 u. 4.

³ Münch. med. Woch., July 10, 1900.

⁴ Bull. de l'Acad. de Méd., Aug. 28, 1900.

tysis, which was repeated through several days, and Lancereaux states that he did not hesitate in the absence of any preceding thoracic trauma or of signs of pulmonary or cardiac lesions to diagnose a neuropathic hemorrhage in spite of the fact that a few months later the man died from severe hemorrhage.]

PNEUMONIA.

Etiology and Pathology.—J. Bernheim¹ describes a case of pneumonia in a 14-months-old child which ended fatally and in which he found the **meningococcus** in large numbers in the lungs; he attributes the pneumonia to this organism. He finds that there are previous reports of the occurrence of pneumonia as the result of infection with the meningococcus, and numerous instances of bronchitis apparently due to this organism. Bronchitis from this cause is usually of no clinical importance, as it runs a mild course. It must be remembered, however, that such cases of bronchitis may ultimately be of importance, as they may be important means of spreading epidemics of cerebrospinal meningitis.

C. Norris and J. H. Larkin² describe 2 cases of necrotic bronchopneumonia in which there were very numerous colonies of **streptothrix**, which appeared as yellowish-white spots in the lumen of the bronchi. Infection of rabbits with this streptothrix produced severe pulmonary changes with involvement of the pleura and the occurrence of empyema, and the streptothrix was discovered in the pleural exudate. They were unable to cultivate the streptothrix upon the human lung, but did produce colonies upon sterile fresh kidneys. The organism seemed to be nearly identical with the streptothrix Israeli. It was moderately pathogenic in guinea-pigs.

Renon³ holds, with other French investigators, that **Aspergillus fumigatus** may be the primary cause of disease, just as the ray fungus and the tubercle bacillus are. Primary aspergillosis is not rare, and may occur in the skin, and especially in the respiratory tract, where, in the lungs, it has been called pseudotuberculosis. It is most often contracted by contact with grain.

A. Moisseau,⁴ after careful study of 5 cases of pneumonia due to the **Friedländer bacterium**, states that in this form of pneumonia the hepatization in the early stage is due not only to exudation into the alveoli, but, to a greater degree, to the production of large amounts of mucus by the bacteria themselves. The amount of the fibrinohemorrhagic exudate is not great; therefore there is no real red hepatization, and the pneumonic areas have from the beginning the appearance of gray hepatization. In the stage which corresponds to the gray hepatization in Fränkel's pneumonia the number of leukocytes in the exudate becomes increased, but the mass of mucus and bacteria present in the alveoli is so great as to prevent a very marked exudate of leukocytes into the alveoli

¹ Deut. med. Woch., Oct. 4, 1900.

² Jour. Exper. Med., vol. v, p. 14.

³ Wien. med. Woch., Nov. 3, 1900.

⁴ Bolnit. Gaz. Botkina, Nos. 20 and 22, 1900.

themselves. The leukocytes, therefore, infiltrate the walls of the alveoli, but do not enter the alveoli to any considerable extent. In the last stage the exudate degenerates, and the hepatization becomes somewhat hemorrhagic in character. Thrombosis of the vessels sometimes occurs, and necrosis of the tissue of the lung results, with, perhaps, hemorrhage, and the production of cavities.

Müller¹ demonstrates that in the **aspiration pneumonia of infants** the process develops from the alveolar walls in all directions, then in the septums, the lymph-spaces, and lymph-channels. This is also probably true of croupous pneumonia.

A. Prochaska² decides from his investigations that the previous attempts to demonstrate the **pneumococcus in the blood** of patients with pneumonia have been only irregularly successful because the amounts of blood used were too small. He reports 10 cases, in all of which pneumococci were demonstrated by culture. Four of these cases were severe and complicated, but the remaining 6 ran a favorable course and ended in entire recovery. His method of investigation was to take a considerable amount of blood from an arm vein with a sterile syringe, and to inoculate 4 or 5 cc. upon bouillon. The value of the use of such large amounts of blood was demonstrated by controls, in which he inoculated bouillon or agar with from a few drops up to 1 cc. of blood. When using the smaller amounts, the results were very inconstant. [This statement is concurred in by many others. We have observed the same fact in other infectious diseases, particularly septic conditions, blood cultures made with large quantities of blood proving positive when no colonies developed in cultures made at the same time with smaller quantities.]

Symptomatology.—C. Z. Weber³ contributes a digest of 200 personal cases of pneumonia. Over 50% of these cases occurred in the winter months, 38% in the spring months. Certain persons seemed to be especially susceptible, 31 attacks having been observed in 13 individuals; also, certain families showed peculiarly large numbers of cases. [This is attributed to family susceptibility. It might, however, be attributed quite as reasonably to the conditions under which the family lived, or to contagion.] The disease was right-sided in 58% of the cases, left-sided in 35%, double in 7%. It was associated with other diseases in just one-half of the whole number; with grip 40 times, with tuberculosis 13 times. The general mortality was 9%, the mortality in complicated cases being 11%, in the uncomplicated 7%. Of the 14 cases of double pneumonia, 10 patients died. Six cases are termed walking pneumonia, the patients being found, while under ambulatory treatment, to have consolidation of the lung. Of 4 cases of interstitial pneumonia, 3 were left-sided; 1 of the 4 patients died of rapid tuberculosis, 2 recovered entirely, while 1 has never regained good health. In 2 cases there was jaundice associated with the pneumonia. These patients were brothers, small boys, who had been wan-

¹ Wien. med. Woch., Nov. 10, 1900. ² Centralbl. f. innere Med., Nov. 17, 1900.

³ Phila. Med. Jour., Sept. 29, 1900.

dering about in sewer excavations. Weber believes that pneumonia may practically always be attributed to some preexisting depressing influence. He finds that pneumonia is more prevalent in certain periods, and in certain periods also shows a more malignant type. Left-sided croupous pneumonia seemed to be more difficult to manage, and to be more frequently followed by tuberculosis. Catarrhal pneumonia of the apex was always associated with delirium. Weber denies that there is any support of the germ theory of pneumonia. [A denial which is evidently based upon insufficient examination of the conclusive evidence demonstrating the bacteriologic origin of the disease.] In treatment he mentions that he has found, in delayed resolution, free sweating produced by jaborandi or pilocarpin to be frequently effectual.

Prognosis.—Huchard¹ discusses a case of pneumonia in an obese woman of 44. He directs attention to **adiposity as an unfavorable condition** in pneumonia. In such cases the unhealthy state of the other organs is a much more important prognostic factor than the extent of the lung-disease or the height of the temperature. In these cases he recommends bleeding and the subsequent administration of digitalis. He considers the prognosis in pneumonia to be extremely grave if the total urinary chlorids fall below 1 gram per day. He thinks the chlorids should be regularly estimated, and if they are extremely low, salt should be given freely in the food, and the patient should be given saline injections subcutaneously.

E. Becker,² in discussing a series of blood reports, states that in 3 unusually severe pneumonias, which ended fatally, he observed in one a **leukocytosis** of 22,000, which afterward rose to 28,000; in the second a leukocytosis of 16,000, and in the third one of 10,000. In 2 severe cases in which recovery ensued, the leukocytosis was respectively 31,000 and 29,000. In another severe case with recovery the leukocytosis was 17,000, and in a mild case it was 13,000. He decides that a high grade of leukocytosis indicates a severe infection; a moderate leukocytosis, from 12,000 to 16,000, is seen in both severe and mild cases; while a slight leukocytosis, although occasionally caused by mild infection, is usually due to a very imperfect reaction, and is therefore of bad prognosis. High grades of leukocytosis, although due to severe infection, usually mean good reaction. Moderate grades of leukocytosis may mean only a moderate infection or a poor reaction with severe infection. An absolute prognosis, therefore, cannot be made from a mere leukocyte-count. The leukocytosis was polymorphonuclear; the lymphocytes were practically unaffected. In no fatal case were eosinophile cells found. In one severe case, in which the patient recovered, 9% of myelocytes were observed. [The old statement that marked leukocytosis means good reaction, slight leukocytosis poor reaction, cannot longer be maintained without important qualifications.]

Treatment.—Strusberg,³ in discussing the therapy of croupous pneumonia as carried out in the medical clinic at Bonn, states that the gen-

¹ Jour. de Méd., July 10, 1900.

² Deut. med. Woch., Aug. 30, 1900.

³ Therap. der Gegenwart, Nov., 1900.

eral treatment was dietetic and symptomatic. They do not use active **expectorants** in acute cases, but such drugs are sometimes administered when the case becomes protracted. He considers that **potassium iodid should not be used**, since it tends to cause catarrh of the respiratory passages. With marked dyspnea heroin gave good results. If the pulse showed very low tension, or if the tension was very irregular, digitalis was used. Fever was treated, if high or prolonged, by quinin or antipyrin, or by lukewarm baths; cold baths were never used. He believes that such methods of treatment are more satisfactory than those that are more active and violent. The mortality was only 7.97% — figures which compare well with others.

M. Eberson¹ and J. W. Frieser² discuss the value of **creosotal** in the treatment of pneumonia. Frieser considers this preparation the most useful of the substances derived from creosote. He found that it had no unfavorable effects, but rather improved the digestion and acted as a general tonic; the pneumonic process ran a rapid and favorable course. Eberson has used the substance in 23 cases, and saw the fever fall within 48 hours, with outbreak of sweat, and with the occurrence of general euphoria in 2 cases. He thinks that it cuts the disease short, and that resolution takes place rapidly and satisfactorily. The dose he recommends is about 90 grains per day.

A. Petzold³ discusses the value of **injections of quinin** in the treatment of croupous pneumonia. This treatment, which has been advocated by Aufrecht, has been unfavorably discussed by Pel and other authors. Petzold, therefore, analyzes the cases of croupous pneumonia in Aufrecht's service at the Altstadt Hospital of Magdeburg from April 1, 1897, to September 30, 1900. During this time there was a total of 261 patients, of whom 23 died, making a mortality of 8.8%. During the same period there were in the Sudenburg Hospital of Magdeburg 164 cases, with 39 deaths, or 22.5%, and in the Hospital of Neustadt 50 cases, with 15 deaths, or 30% mortality. Analyzing the statistics during separate years, the mortality at the Altstadt Hospital was far below that of the other hospitals, with the exception of 1 year, when 11 cases were treated in the Neustadt Hospital of Magdeburg without a death, whereas among 60 cases in the Altstadt there were 4 deaths, or 6.6% mortality. During the same years the mortality in the Moabit, Friedrichshain, and Urban Hospitals of Berlin was constantly higher than that under his observation in Magdeburg. These statistics answer Pel's criticism that the results of treatment should be compared year for year in different institutions on account of the varying mortality from the disease. In the total number of cases reported from his own hospital, 10 cases admitted in a moribund condition were omitted, as these did not properly come under the treatment discussed; but adding these cases to the entire number of deaths, the mortality still remains as low as 12.2%. With regard to the administration, he states that their present plan is to inject $\frac{1}{2}$ grain

¹ Aertzl. Centralzeitung, 1900, No. 27.

² Aertzl. Centralzeitung, 1900, No. 13.

³ Deut. Arch. f. klin. Med., Bd. LXX, No. 3 u. 4.

of hydrochlorate of quinin (which salt is soluble in 34 parts of water) daily during the continuance of active symptoms. Formerly their plan was an injection but once or twice. Among the precautions to which he calls attention is the necessity of injecting into the subcutaneous tissue and not endermically, and the avoidance of any addition of acid to render the quinin more soluble. Neglect of these precautions has caused the only necrosis or abscesses that occurred in his experience.

W. Ewart and B. Percival¹ report their results from **subcutaneous saline infusion** in pneumonia. They describe 6 cases of very severe form in which they used this treatment, and decide that while unfavorable results were not seen and a fatal termination seemed to be delayed, there was no definite favorable influence seen upon the course of the disease, and the postmortem examinations did not show any notable change in the condition of the lung tissues. They recommend, however, that the treatment should be further used, and that perhaps larger amounts or more frequent administration would give better results. The treatment was well borne by the patients.

Neuhoff² discusses the value of injections of **saline solutions in the treatment of pneumonia**, and he reports a few cases. He believes this treatment is useful as an adjunct to other treatment in certain cases, acting as a heart stimulant and causing an increase of the secretions. The tongue becomes moist, the delirium grows less, and respirations are said to be improved, though he has never observed this. In cases in which there is pulmonary edema the treatment is contra-indicated.

G. L. DuToit,³ in discussing the symptoms and effects of **oxygen inhalation**, strongly recommends its use in pneumonia, believing that it reduces the temperature and relieves the embarrassment of respiration. He also strongly recommends its use in the treatment of ulcers. He states that it has a very striking hypnotic effect in a number of cases. It tends in some instances when inhaled to cause dryness of the mucous membrane, which may be relieved by taking acidulated water. He considers that it causes increase of appetite also, in many cases.

W. Ewart⁴ has experimented with **subcutaneous administration of the dioxid of hydrogen and of oxygen gas**. He found that a local oxygen-emphysema could be produced without bad results, and that the gas will be satisfactorily though slowly absorbed. The most satisfactory method of the two he considers to be the use of the dioxid of hydrogen, but the oxygen gas injection is more easily carried out, the chief danger, in his mind, being wounding of a vein, which can be guarded against by care and by the preliminary application of a band to the upper part of the limb. He has not yet been able to determine whether the subcutaneous administration of oxygen will have valuable clinical results.

S. Baruch,⁵ in discussing the use of **hydrotherapy** in pneumonia,

¹ Brit. Med. Jour., Sept. 29, 1900.

² Med. Rec., May 11, 1901.

³ Edin. Med. Jour., Dec., 1900.

⁴ Brit. Med. Jour., Oct. 13, 1900.

⁵ Med. Rec., Aug. 4, 1900.

states that this treatment meets the indications, which are, to strengthen the heart, to fortify the nervous system, to eliminate toxins, to reduce temperature, deepen inspiration, and produce sleep. In adults he advises the use of wet compresses about the chest. A moderate degree of cold is a stimulant, and does not depress. Chilling should always be avoided. He recommends the frequent use of ice water internally as an aid to the secretion of urine. The compresses which he recommends are made by taking three folds of old linen and wringing them out of water at a temperature of from 60° to 95° F., the higher temperatures being preferable if the fever is very high.

A. Tagesson-Möller¹ recommends the treatment of pneumonia by a **series of manipulations**; for instance, for the pain of the side he advises so-called intercostal friction, consisting in making light strokes with the finger-tips over the painful areas, increasing the force of the manipulation until it becomes energetic friction. A series of other methods intended to be stimulating to the lungs and heart are described. The author believes that the activity of respiration and of the cardiac action can be greatly influenced, and that the disease can be shortened in its course and made less dangerous.

Abscess of the Lung.—O. Jacobson² discusses a series of cases of abscess of the lung in connection with **diagnosis, prognosis, and therapeusis**. As to diagnosis, he insists that in the beginning all physical signs may be entirely absent, and that even examination with the Röntgen rays may be valueless. If there are general symptoms which resemble those of tuberculosis, but tubercle bacilli are absent from the expectoration; if the cough is distressing and accompanied with pain at a definite point, and if, with these signs, clubbing of the fingers develops rapidly, one should suspect abscess of the lung. Later on the abscess is likely to resemble an empyema closely, or empyema forms, and its signs obscure those of the abscess. In one case Jacobson discovered **elastic fibers** in the aspirated pus, and diagnosed the case in this way, but such a method will necessarily be possible only in rare instances. Exploratory puncture is of great importance if the pus removed shows streaks of blood, but this procedure is not without danger, as it may cause the pus to break into the bronchi or may result in empyema. If the pus has broken into the bronchi, the condition is distinguished from bronchiectasis by the fact that the cough is distressing and expectoration is insufficient. The temperature rises with increased expectoration, instead of falling, and the dullness increases. The diagnosis from gangrene is very difficult. The prognosis and treatment vary largely and depend upon the situation of the abscess. Jacobson considers that operation is always indicated when pus is retained, but he considers the artificial production of pleural adhesions worthy of trial as a preliminary. The occurrence of empyema makes the prognosis better, rather than worse.

Unilateral Atrophy of the Lung.—E. Neisser³ describes 2 cases

¹ Deut. med. Woch., Dec. 27, 1900. ² Zeit. f. klin. Med., Bd. XL, S. 494.

³ Zeit. f. klin. Med., Bd. XLII, H. 4 u. 2.

of unilateral atrophy of the lung with great enlargement of the remaining lung toward the affected side without any notable deformity of the two sides of the thorax as compared with each other. The patients were father and son. Neisser considers the condition to have been either congenital or acquired in very early life, because the cases occurred in one family, and because the affected side of the thorax was not deformed. If the atrophy of the lung occurred early, he considers that the readiness with which the tissues of the young grow and adapt themselves to abnormal conditions would permit of marked hypertrophy of the unaffected lung chiefly toward the diseased side, filling up the space made vacant, and thus preventing deformity so long as pleural adhesions are absent. He considers that the condition is probably the result of a congenital bronchiectasis.

Calcosis.—Theo. Fisher¹ reports a remarkable case of extensive deposits of phosphate of lime in the lungs. The patient, a woman of 32, was admitted to the hospital with pneumonia, from which she died on the same day. The lungs were found adherent and the apices scarred with superficial tuberculous disease. There were no fibroid or calcareous nodules and no tuberculosis of the pleura or other parts of the lungs. The right lung was consolidated throughout and the left lung was resistant, though not the seat of recent consolidation. The cut surfaces showed small gritty nodules or granules like grains of sand. The entire lung was studded with these and the organ weighed—the left 45 ounces, the right 57 ounces. The amount of infiltrated material was determined by repeatedly washing a portion, a cubic inch in size, after tearing the substance. The dry granules obtained from this weighed 98 grains. The examinations of these formations determined that they consisted of water, 8%; albuminoid matter, 7%; phosphate of lime, 75.7%; nonnitrogenous matter, carbonates, and undetermined substances, 9.3%. Microscopically, there was scarcely any nucleus and the formations showed a laminated concentric arrangement. The history of the case gave no clue to the origin of the trouble. The action of the lungs had not apparently been interfered with. No exact or similar case is recorded in the literature, but the author finds a reference in Cohnheim's "Lectures on Pathology," volume II, page 642, to an instance of extensive calcification, and Virchow is reported in the same place as saying that he has seen lungs with such marked deposits of lime salts that they felt like pumice-stone. A case recorded in the "London Medical Record," 1879, page 189, was one of infiltration with lime and magnesium salts in the form of needle-shaped crystals. The infiltration amounted to 14% of the weight of the organ. The author's own case is regarded as one of secondary infiltration of amyloid bodies. He believes that these bodies started around nuclei, though no distinct trace of these remained.

¹ Lancet, Jan. 26, 1901.

DISEASES OF THE PLEURA.

J. A. Grober¹ discusses the **portals of infection** of the pleura from neighboring tissues. Three methods of infection are possible. These are by means of the respiratory channels, the mediastinum, and the lung tissue of the apices. The possibility of the first of these three is shown in animal experiments. The forcible inhalation of finely pulverized stains was followed by the discovery of granules in the parietal and visceral pleura, and discolorations of the lymph-channels along the lower border of the ribs. The second method of infection is well shown by many clinical observations. The third method is of importance because of recent work concerning infections of the tonsils and cervical lymph-glands. The retrograde transportation of poisonous substances through the lymph-channels must be considered possible, and Grober has demonstrated the possibility of this in the condition under discussion by injecting suspensions of stains in the tonsils, and by discovering afterward particles of the dye in the lymph-channels of the neck down to the supraclavicular region, in the mediastinal and subpleural lymph-glands, and even in the lymph-channels of the lower mediastinum. Grober therefore believes that it must be considered quite possible that tubercular infection of the apices of the lungs may take place in this way.

L. Golubinin² reports a **remarkable case** of pleurisy in a young man in which in four operations 12 liters of a seropurulent exudate were removed from the pleural cavity. The specific gravity of the fluid was 1018, and the weight of the total exudate removed was about 30 pounds. The largest weight of exudate reported previous to this time was 22 pounds. The large collection of fluid produced a striking dislocation of the organs, but no circulatory disturbance, and the general health of the patient had not greatly suffered, owing to his strong constitution and his lack of other organic disease.

C. L. Allen³ reports the case of a man of 44 who died suddenly as a result, he thinks, of pleurisy. The patient was a terminal dement who had fever, but no definite signs of local disease. The autopsy showed about 180 cc. of fluid in the left pleural cavity, and firm adhesions over nearly the whole surface of the right lung, with some recent pleurisy over the anterior surface. The right upper lobe contained two hemorrhagic infarcts. There were firm dark clots in the medium-sized branches of the right pulmonary artery, and the left pulmonary artery was completely filled by a firm dark clot which extended into its larger division. The brain was normal macroscopically, except for adhesions to the dura and some patches of milkiness in the pia arachnoid. He refers to the possibility of **sudden death occurring in pleurisy** as a result of suffocation from rupture of an empyema into the lung, from sudden development of edema, and from thrombosis or embolism of the pulmonary artery, or thrombosis of the right heart; and also to the

¹ Deut. Arch. f. klin. Med., Bd. LXVIII, H. 3 u. 4.

² Bolnit. Gaz. Botkina, Nos. 39 and 40.

³ Phila. Med. Jour., Feb. 9, 1901.

possibility of kinking of the aorta or vena cava through displacement of the heart by the effusion. Thrombosis or embolism seems to be the most common cause of death in these cases. In the case under discussion Allen believes that fibrin was absorbed from the area of fresh pleurisy, was carried to the pulmonary vein, lodged there, and produced a gradual thrombosis. He thinks that the case gives no support to the theory of kinking of the vessels.

H. B. Allyn¹ discusses **pleural exudate with physical signs of pneumonia**, especially those cases in which there is increase of vocal resonance and fremitus or bronchial breathing. He describes a case in which, with flatness of percussion over the whole of the left lung and increase in resistance, there was also increase of fremitus, high-pitched tubular breathing, numerous moist rales and bronchophony and pectoriloquy. The patient was said to have been well until 9 days before admission, and had had the usual symptoms of the onset of pneumonia. Autopsy showed fibroid lung with thickened pleura, empyema, and old tuberculosis. The air space above the small collection of pus was apparently sufficient to act as a resonator, the voice-sounds and breath-sounds being transmitted through the dilated bronchus. The important signs distinguishing pleural exudate Allyn considers to be a curved line along the upper edge of the flatness, change in the level of the flatness on change of posture, the presence of skodaic resonance above the flatness anteriorly, displacement of organs, and restricted movement of the diaphragm on the affected side. Aspiration with a large hypodermic needle is always a useful diagnostic measure. [One of the most important signs is the absolutely dead flatness in pleural effusion and the decided sense of resistance on percussion. This is, we believe, more important than is usually admitted.]

Schmidt² describes a **respiratory abdominal reflex** which he observed in a tuberculous subject of 35, who had a right-sided pleurisy. He noted upon deep inspiration, particularly toward the end of inspiration, that there was a sudden very rapid contraction in the upper part of the right rectus muscle, the wave suddenly passing upward as high as the fifth intercostal space. The phenomenon was much more notable when the patient breathed quickly and deeply, and pressure upon painful points in the intercostal spaces brought it out even more markedly. It was evidently a reflex, and Schmidt thinks it might be of practical importance if observed in other cases, and would perhaps indicate directly the presence of inflammation of the pleura in the lower part of the thorax or perhaps of the peritoneum in the upper part of the abdomen.

N. Worobjew³ has treated 15 cases of serous pleurisy by **applying guaiacol to the skin**. He found that the unfavorable results of this treatment were very marked. There was a decided drop in temperature, the patient became bathed in sweat, the extremities were cool, the breathing rapid, the pulse weak and rapid, the pupils dilated, and there was

¹ Phila. Med. Jour., Sept. 29, 1900.

² Wien. klin. Woch., 1900, No. 45.

³ Bolnit. Gaz. Botkina, No. 27.

severe general weakness. After several hours there was often a chill, after which the temperature rose higher than before the application. The patients lost weight, and their nutrition and general appearance seemed to become decidedly worse under the influence of this treatment.

Empyema.—Béclère¹ explains the pulsation in cases of **pulsating pleuritis** by the fact that, by the spreading of the pus on the left side, the resistance of the thickened fibrous right wall of the mediastinum becomes greater than that of the left wall, so that every heart-contraction presses toward the left. His investigation on the cadaver, and with the Röntgen rays, and his observations of a case support his theory.

R. W. Marsden² describes the case of a girl of 11, who had vomiting, diarrhea, and fever, with enlargement of the spleen, but with negative Widal reaction. Although the fever fell subsequently, she later developed signs of double pneumonia at the bases. An **empyema** was subsequently found on the right and was evacuated. There had been a good deal of pain in the abdomen before the operation, and was thought to be due to the pleurisy. As this pain continued and was extreme, an exploratory incision was undertaken, and on the posterior surface of the rectus there was found a mass of **thick yellow pus** which had burrowed between the transversalis fascia and the abdominal wall, 37 ounces being evacuated. The patient soon improved, and left the hospital practically well.

Pneumothorax.—Duplant³ discusses **pneumothorax and valve mechanism**. He compares the act of coughing in cases of broncho-pleural fistula to pumping a pneumatic bicycle tire, the cough dilating the fistulous tract, and filling the pleural cavity as pumping fills the tire. He thinks that there is more or less valve mechanism in practically all cases of pneumothorax. He directs especial attention to the importance of localized adhesions between the two pleural layers in explaining the production and course of pneumothorax. If the two layers of the thorax have become completely adherent, pneumothorax does not occur, but if there are well-organized strings of adhesions, a portion of the pleura is held firmly fixed by these, while any strain, such as coughing, exercising, etc., causes a correspondingly greater strain upon neighboring areas, and the result is likely to be a rupture in the neighborhood of the bands of adhesions. This effect of adhesions is shown by postmortem examinations. Such an accident is particularly likely to occur if the lung in the region where the rupture occurs has been rendered less elastic by a subpleural deposit of tubercle, or if there is a cavity near the pleura. There are frequently adhesions of the pleura in tuberculous subjects, hence a pneumothorax is likely at first to be partial or multilobular. The pneumothorax subsequently very commonly becomes almost or quite complete, the air rupturing the adhesions in much the same manner that subcutaneous emphysema dissects along the loose connective tissue.

Brasche⁴ states that in the 230 cases of pneumothorax which he has

¹ Wien. med. Woch., Nov. 3, 1900.

³ Rev. de Méd., Sept. 10, 1900.

² Lancet, Nov. 3, 1900.

⁴ Wien. med. Woch., 1900, No. 27.

seen, 5 showed **bilateral pneumothorax**; in 2 of these a definite diagnosis was reached during life, and 3 were only suspected. In the first case there was a right-sided pneumothorax with involvement of the left side within 24 hours. The patient lived 12 hours after the appearance of the pneumothorax on the left. The right-sided pneumothorax in this case was found to be only partial. This observation confirms the statement of Skoda that a bilateral pneumothorax is only possible of observation and diagnosis when the pneumothorax on one side is partial. In the second case death occurred 2 hours after the appearance of the bilateral pneumothorax, and in the third case only a few minutes afterward. In neither of these cases was a partial pneumothorax present. These cases are a confirmation of the usual teaching that death usually occurs within a few minutes or a few hours after the occurrence of bilateral pneumothorax, and that in case the prolongation of life is beyond several hours the pneumothorax on one side is only partial.

DISEASES OF THE MEDIASTINUM.

M. Weinberger¹ discusses the **Röntography of the normal mediastinum**. He concludes that the median shadow which one sees by the fluoroscope is due to the spinal column, for the shadow of the sternum is extremely slight. The median shadow usually seen lying alongside the spinal column is on the left side due to the arch of the aorta and the ascending aorta, that on the left to the superior cava. At the top of the shadow on the left one can observe pulsation of the aorta. He believes that one can make out by the fluoroscope on the right the vena cava and right auricle, and on the left the pulmonary artery and the left auricle and a shadow due to the vessels at the hilus of the lung and the lymph-glands in this region.

Wittlauer² discusses **intermittent fever as a symptom of mediastinal tumor**. He describes the case of a woman of 24 who had pains in the side of the chest, with cough and fever. There was dullness on percussio, weakness of the breath-sounds, and hectic fever. Exploratory puncture yielded a clear fluid. The fever persisted for 5 months, and was of a curious relapsing character, with regular remissions. The remissions lasted usually 3 or 4 days; there was then a rapid rise of temperature; on the following day the temperature was usually less, the next day normal. Malarial parasites were carefully looked for, but were never found. Treatment was wholly without avail. In the latter part of life the patient showed cyanosis, throbbing of the vessels of the neck, and afterward signs of bronchial stenosis, and finally death occurred chiefly as a result of the stenosis of the bronchi. The postmortem examination showed a large mass in the posterior mediastinum that had involved the walls of both auricles of the heart, had compressed both bronchi and the left branch of the pulmonary artery, and had also involved a considerable part of the right lung. Microscopic examination showed it to be a round-cell sarcoma.

¹ Zeit. f. Heilk., 1900, Bd. XXI, H. 2.

² Münch. med. Woch., Jan. 29, 1901.

DISEASES OF THE DIGESTIVE TRACT.

DISEASES OF THE MOUTH AND PHARYNX.

O. Muck ¹ states that he is of the opinion that **potassium sulphocyanid** is present in the nasal and conjunctival secretions as well as in the saliva. The potassium sulphocyanid in the nasal secretions he believes does not come from the conjunctiva. The methods he used to demonstrate the presence of potassium sulphocyanid were the usual reactions with hydrochloric acid and chlorid of iron and Solera's test, which he carried out by saturating chemically pure filter paper with a mixture composed of starch paste, dilute sulphuric acid, and concentrated iodic acid. The paper is allowed to dry and narrow strips are introduced into the nose or touched to the conjunctival secretion. The occurrence of a blue color indicates the presence of potassium sulphocyanid.

A. W. Perry ² presents a study of various forms of bread and of their salivary digestion, and concludes that the **digestibility of various breads** is in direct relation to the amount of saliva which they absorb during mastication.

W. Hunter ³ discusses oral sepsis as a cause of septic gastritis, toxic neuritis, and other septic conditions. He directs attention to the frequency of **purulent inflammation of the gums**, and the possibility of subsequent caries of the teeth, of suppuration in neighboring cavities, and involvement of the tonsils and pharynx. Swallowing septic material may be followed by severe gastritis, and may produce nausea and vomiting, and severe gastric pains, and is likely to be followed by general toxic symptoms, such as a pasty grayness of the complexion, fever, weakness, and perhaps toxic neuritis. In the latter connection he mentions 2 cases of weakness and atrophy of the arm muscles and of the deltoid, with reactions of degeneration in some of the muscles. The symptoms disappeared after proper treatment of the causal conditions.

D. H. Galloway ⁴ reports a case in which **antistreptococcic serum** was used with good results. The patient was a young woman who with several sisters showed symptoms of scarlet fever, and although the patients had all had scarlet fever, it was believed that they had recurrences of the disease. The patient in whom the serum was used had swelling of the glands of the neck, with marked tumefaction about the swelling, the latter becoming of such a degree that the mouth could not be opened, and the condition seemed to be likely to cause death. The use of the serum resulted in improvement, and after 6 doses had been given the patient was practically recovered and became entirely well. Staphylococci were found in the pus from the abscess, but there was no definite evidence that it was a streptococcic infection. There was a **peculiar coating on the tongue** which consisted of slender

¹ Münch. med. Woch., Aug. 21, 1900.

² Pacific Med. Jour., Sept., 1900.

³ Practitioner, Dec., 1900.

⁴ Phila. Med. Jour., Aug. 4, 1900.

filaments from $\frac{1}{4}$ to $\frac{1}{2}$ inch in length growing vertically. The growth was thought to be a fungus. A report from the Agricultural Department at Washington stated that it was probably sarcoma. After it was cured, however, it did not recur, and Galloway believes that it was an outgrowth of epithelium.

W. Elder¹ describes a case of **parotitis** involving the gland on the right, which appeared 3 days after operation for appendicitis in a man of 20. The left gland afterward became involved. The glandular swelling was accompanied by severe pain and fever. A brother of the patient had had mumps shortly before, and Elder was in doubt as to whether the case was one of actual mumps or was a complication of the operation itself.

J. E. Tally² describes a case which he considers **angioneurotic edema of the salivary glands**. It occurred in a woman of 34, who had been under his observation for 5 years and had twice had septicemia from retained membranes after abortion; she also had nephritis, which had persisted since the first abortion. She was apparently very susceptible to microbial and other poisons; 2 grains of quinin had on two occasions produced severe urticarial eruption, and 3 douches of a 1:8000 bichlorid solution had produced severe pyralism. She had been almost a constant sufferer from severe attacks of urticaria. She had occasionally had asthma, and had had repeated attacks for several years of temporary swelling at the angle of the jaw. In the attack in which she was seen the submaxillary and sublingual glands were found very large and tender, the parotids being slightly swollen. The attacks began at about 7 in the morning each day for several days, the swelling of the gland being very rapid and reaching its maximum in about 15 minutes, and being accompanied by a profuse flow of saliva. The return to normal was accomplished in from 3 to 24 hours. Preceding the attack she had nausea, belching, and gastric distress. There was no evidence of salivary calculi.

A. A. Hijmans van den Bergh³ describes a case of **painless dense enlargement** of both parotid glands, with dryness in the mouth and throat and reddening of the conjunctiva, but without any general symptoms of disease. The condition arose gradually, and after a few months disappeared spontaneously and completely. The author directs attention to the close resemblance between this case [and others reported in the literature of similar character] and the cases described by certain French authors as saturnine parotitis. He believes that the cause is some toxemia.

E. Mayer⁴ discusses a case of **recrudescing angina caused by Friedländer's bacillus**. But few cases of pharyngitis have been reported in which this organism seemed to have any etiologic importance. In referring to the literature, Mayer states that 1600 cultures from diseased throats showed its presence but 8 times. In all, about 15

¹ Lancet, Jan. 19, 1901.

² Phila. Med. Jour., Oct. 20, 1900.

³ Nederl. Tijdsch. voor Geneeskunde, 1900, No. 2, p. 338.

⁴ N. Y. Med. Jour., Dec. 22, 1900.

cases due to this bacillus are known. The case reported by Mayer was at first thought to be chronic diphtheria, but the Klebs-Löffler bacillus was never found. The patient, however, had previously had a true diphtheria. The case, therefore, in common with others previously reported, had a history of previous acute disease of the throat. The way to infection by the bacillus of Friedländer is probably paved by the other previous infection. Bacteriologic examination of this case by Lartigau showed the presence of the bacillus of Friedländer in large numbers.

DISEASES OF THE ESOPHAGUS.

Dilation and Diverticulum.—T. Rosenheim,¹ in discussing dilation and diverticulum of the esophagus, lays strong emphasis upon the **importance of esophagoscopy**. He directs attention also to the fact that in ectasis near the cardia the dilation is likely to be chiefly toward the right, because the tissue is looser on this side, and because the pulsation of the heart to some extent prevents dilation toward the left. It is a question whether spasm of the cardia is the only cause of dilation in this region. It is certainly frequently complained of in the beginning of the trouble. Rosenheim reports 1 case to show that spasm of the cardia can under some circumstances produce hypertrophy of the esophagus, which to a certain degree compensates for the obstruction.

Max Einhorn² discusses **idiopathic dilation** of the esophagus, a condition by which is meant a dilation without any mechanical obstacle within or outside the walls or at the cardia. This condition was first described by Purton in 1821, and a few other cases were recorded early in the century. General attention, however, has only recently been directed to this form of esophageal disease. The author has reported 2 cases and now adds 10 others. Among these 12 there were 2 in which a distinct etiologic factor was discovered; trauma in one case and benign stricture in the other. He stated in his previous paper that idiopathic dilation of the esophagus might result from paralysis or atony of the esophagus, spasmodic contraction of the cardia, and a failure of the reflex opening of the cardia during the act of swallowing. In several of his cases there was a slight resistance at the cardia due to spasm. In most of the cases it was impossible to determine which of the 3 causes was operative. In discussing the symptomatology, dysphagia comes first as the most constant symptom. Sometimes it is scarcely sufficiently marked to be observed. There may be merely a feeling of pressure or fullness in the chest; often there is a sense of suffocation or dyspnea, frequently a troublesome cough, developing especially at night and in the recumbent posture. Regurgitation or vomiting occasionally appears soon after meals. Loss of flesh from voluntary starvation is a frequent symptom. The swallowing sound of Meltzer is absent. In none of his cases could he find either the first or the second sound. The diagnosis is made from malignant growths, diverticula of the esophagus, and an antrum cardie by the use of the stomach-

¹ Zeit. f. klin. Med., Bd. XLI, S. 177.

² Am. Jour. Med. Sci., Sept., 1900.

tube. If, after drinking coffee or other colored liquid and forcing this into the stomach by compression of the chest, and after a second quantity of clear water has been taken, a stomach-tube will throw off separately the two liquids, the diagnosis is positive, provided the liquid drawn from the upper pouch is considerable, and that the stomach-tube is easily passed into the stomach. In the case of an antrum cardiac only a small quantity of liquid could be withdrawn from the upper pouch, and in the case of diverticulum the stomach-tube would occasionally pass into the diverticulum and thus fail to reach the stomach.

Stenosis.—Dauber¹ reports a case of **spastic stenosis** of the cardiac orifice of the stomach, which was followed by severe catarrh of the esophageal mucous membrane and a spindle-shaped dilation of the esophagus, the latter being diagnosed by the introduction of a bismuth solution and the use of the Röntgen rays. Treatment of this case by applications of eucain proved entirely useless. Dauber thinks that this treatment acts satisfactorily only in cases of local irritation followed by secondary spasm. The use of olive oil will prove of value only in cases of organic stenosis in which there is still a passage-way sufficiently wide for substances to pass after the oil has acted as a lubricant. Sedatives, bromids and belladonna, tonic treatment, galvanic and faradic electrical treatment had no definite effect in the case reported. The most important procedures he considers to be the decrease, so far as possible, of the irritation of the esophagus, the use of esophageal lavage, and of rectal or subcutaneous nourishment. Gastrotomy was undertaken in this case, but the results were very unsatisfactory; the patient was very nervous, and could not bear the presence of a permanent tube in the stomach. A radical surgical operation is considered to be indicated in those cases in which the affection is practically incurable.

Groszlik² reports an instance of spastic stenosis of the esophagus in a man with prostatic hypertrophy, accompanied by infection of the urine. The man was unable to swallow either fluid or solid food, and sounding the esophagus showed the presence of an obstruction. Malignant disease was thought to be present, but **treatment of the urinary difficulty** resulted in the disappearance of the esophageal symptoms.

Carcinoma.—Höldmoser³ describes 2 cases of **latent carcinoma of the esophagus**. The first patient was a man of 56, who had the general symptoms of malignant neoplasm, and the extreme emaciation and loss of strength gave the impression that the gastrointestinal tract was involved, but there were no symptoms directly pointing toward the esophagus, and the esophagus was not sounded. There was, however, paralysis of the left recurrent nerve, and an enlarged lymph-gland in the right suprascavicular region. Autopsy showed an ulcerating carcinoma of the esophagus in the lower third, and numerous metastases. In the second instance a woman of 50 had indefinite gastrointestinal symptoms with severe emaciation, and subsequently the appearance of

¹ Mittheil. aus dem Grenzgeb. der Med. u. Chir., Bd. VII, H. 1.

² Centralbl. f. d. Krankh. d. Harn- und Sexual-Örgane, Bd. XI, H. 2.

³ Wien. klin. Woch., 1900, No. 41.

metastases. There was a left-sided paralysis of the recurrent nerve, but no other definite symptoms relating to the esophagus, and it was thought that there were metastases in the cervical vertebrae from some primary growth. Autopsy showed a carcinoma on the level of the bifurcation of the trachea, with metastases in the liver, the glands, the long bones, and the bones of the skull.

Rupture of the Esophagus.—E. J. McWeeney¹ reports a case of **spontaneous rupture** of the esophagus which occurred in a man of 40, who was an alcoholic. After severe retching he complained of pain in the chest, which was followed by an emphysematous swelling of the neck and chest, cyanosis, dyspnea, and collapse. He died, and the autopsy showed a linear rupture of the esophagus just above the diaphragm. The mucosa showed little change excepting rupture. The underlying tissues, however, stained badly, and were evidently degenerated. McWeeney decided that the rupture was due to the sudden increase of pressure acting upon the softened coats of the esophagus. He reports 16 other cases collected from literature. [The conditions discovered postmortem in a case under our observation were precisely the same as in McWeeney's.]

DISEASES OF THE STOMACH.

Methods of Examination.—P. Edel and F. Volhard² have investigated **Quirolo's method** for the determination of the size of the stomach. This consists in the use of an apparatus composed of a stomach-tube, the stomach end of which is covered by a small rubber balloon. The free end is armed with two tubes, one of which is connected with a drum-head, and the other has a stop-cock attached to it. The stomach-tube is introduced into the stomach, the balloon is inflated, and one then percusses on the abdomen and watches the pencil on the tambour. As soon as the percussing finger reaches the area over the stomach the pencil is set into active motion. Edel and Volhard have found that the method gives good results if the stomach is already partly filled with air. If the stomach is entirely empty the balloon does not distend the organ sufficiently to give accurate results. [Elaborate methods of this sort are useless, because the stomach can be easily outlined by inflating it with air.]

D. W. McCaskey³ describes a method of determining the **position of the cardia**. The instrument which he uses consists of a rubber tube, upon the stomach end of which there is attached a small rubber bag. The instrument is introduced into the stomach, the bag is distended and kept so, and traction is made upon the tube until the distended bag can be felt meeting the resistance of the cardia. The measurement is then taken on the tube and the distance of the cardia is readily determined. He gives a series of measurements in cases that were chiefly abnormal. The distance was found to vary from 38 centimeters to as much as 52 centi-

¹ Lancet, July 21, 1900.

² Dent. med. Woch., Aug. 30, 1900.

³ Phila. Med. Jour., July 28, 1900.

meters. He considers that the use of this instrument will prove to be of value in determining the size of the stomach, first determining the position of the cardia and then determining the depth to which one must introduce the stomach-tube in order to get a flow when fluid is present in the stomach. It may also prove to be of some value in the diagnosis of hour-glass contraction of the stomach. The position of the cardia in relation to the other structures in the body may also be determined by attaching a piece of metal to the end of the tube and withdrawing, as noted above, until the bag meets the cardia, then taking a radiograph.

W. Becher¹ recommends the determination of the **lower border of the stomach** by introducing a stomach-tube, pouring a bismuth solution into the tube, and at the same moment examining the patient with the fluoroscope. As the fluid issues from the gastric end of the tube it will at first be seen as a very dark shadow, which soon diffuses over the surface of the stomach; the lower border of this shadow will indicate the lower border of the stomach, and this can be marked with Levy-Dorn's special pencil. The results by this method are more satisfactory, he states, than actual Röntographs or more prolonged examination with the fluoroscope. In the latter methods of examination the bismuth becomes so largely diffused over the surface of the stomach that the results are less definite.

C. Quinan² describes a method for the graphic **study of gastric peristalsis**. The apparatus consists of a rubber bag which is supposed to fit the inside of the stomach accurately, a graduated cylinder of 4000 cc. capacity for measuring the contents of the bag after inflation, and a manometer for recording the changes in tension. The changes in intragastric tension are recorded on the drum of the kymograph. [It has been recognized that the results obtained by methods of this kind indicate changes not only in the intragastric tension, but in various factors which influence intraabdominal pressure in general, and consequently the results obtained are only approximately correct, and are of uncertain value.]

D. L. Edsall,³ in a **critique of certain methods** of gastric analysis, reports an investigation of the method suggested by Cohnheim and Krieger for the determination of the combined HCl of the gastric contents. He found the results obtained by it to be extremely accurate, and considers it the most simple and accurate method that has yet been devised, for clinical purposes at any rate. The method suggested by Hewes for the estimation of the free and combined HCl and the acid salts and organic acids he considers to be too inaccurate to have any value even for clinical purposes, the errors being chiefly the recommendation that titration for total acidity be carried to a point at which a deep red color is obtained with the phenolphthalein indicator, the use of Congo red as an indicator for free acid and acid salts, and, further, the use of three indicators, thus including the errors necessarily incident

¹ Deut. med. Woch., Jan. 10, 1901.

² Phila. Med. Jour., July 28, 1900.

³ Univ. of Penna. Med. Bull., Apr., 1901.

to the use of each of these indicators. He has investigated the value of the use of Congo red as an indicator of acid salts, and finds that while, as is known, it does react to some acid salts, it reacts only imperfectly, and can by no means be used as an indicator. As to the method recommended by Cohnheim and Krieger, he found that in solutions of protein and HCl of known strength the use of this method indicated the full amount of HCl, both free and combined, with accuracy, and that similarly accurate results were obtained when lactic acid was present, and when acid, neutral, or basic phosphates were added to the mixture. Time can be saved by filtering off one-half (20 cc.) of the fluid after precipitating with calcium phosphotungstate, and then doubling the result obtained by titrating this fluid.

S. Heichelheim¹ contributes a report concerning the value of iodipin as an **indicator of the motor power** of the stomach. This substance, which is an iodine-fat combination, is said to be broken up in an alkaline medium and iodine is set free. If it has passed from the stomach into the intestine normally, the saliva should give a reaction within $\frac{3}{4}$ hour. Heichelheim administered 20 to 25 grains in capsules, and found that the reaction occurred within the normal limit almost constantly, unless there was pyloric stenosis or gastric ectasis, with motor insufficiency. The only condition which seemed to be seriously disturbing was icterus. In all the cases investigated, whether there was any gastric disturbance or not, icterus interfered with the reaction for hours or permanently. The reaction was, with scarcely any exception, delayed for more than an hour when there was stenosis of the pylorus or motor insufficiency of the stomach. If, then, the stomach-tube cannot be used to determine the motor power of the stomach, he recommends this method as giving fairly satisfactory results. [This method has not yet been sufficiently tested to allow of any definite decision as to its value. It does not, however, seem to present any great advantage over the old salol test, and disease of the pancreas, as well as icterus, would seem a probable disturbing factor. Furthermore, the recent work on the fat-splitting ferment of the gastric juice makes it not improbable that decided alterations in gastric secretion might cause important differences in results.]

GENERAL CONSIDERATIONS CONCERNING GASTRIC DISEASE.

G. Rosenfeld² has carried on further investigations concerning the **position of the stomach** by means of his own method—examining the organ with the fluoroscope after introducing a tube filled with shot, and at the same time blowing in air through fine holes in the lower end of the tube. He likewise investigated a series of cadavers, and considers that he and Doyen are correct in stating that the stomach in most persons lies nearly vertical. Contrary to Meinert's statement, he believes that this position is not pathologic. Rosenfeld believes that in the normal position the lesser curvature passes toward the left and downward,

¹ Zeit. f. klin. Med., Bd. XLI, H. 5 u. 6.

² Münch. med. Woch., 1900, No. 35.

bending upward somewhat in the neighborhood of the pylorus. The lowest point of the normal stomach is never below the bicostal line. He believes that there is no fundus minor in the stomach, but that the pyloric portion is really a narrow tube about the diameter of the small intestine. He considers that the capacity of the normal stomach is about $1\frac{1}{2}$ liters. [The testimony offered is not yet sufficient to alter the older ideas concerning the position of the stomach. The function of the organ is largely to act as a reservoir while chemie and mechanical changes are occurring; a vertical position would certainly seem to be an unfavorable one for this purpose.]

Schreiner and Riegel¹ have repeated Troller's work, and have confirmed his statement that the **amount of gastric secretion** is to a considerable extent **dependent upon the act of chewing**. They used ordinary test-meals in their work, but also administered various other forms of food, such as eggs, meat, bouillon, etc., and found that when these were administered by the stomach-tube, the acidity of the contents after their removal was decidedly lower than when the food had been chewed. It was notable, however, that extracts of meat under normal circumstances seemed to exert such an irritant action upon the mucous membrane that there was very little difference in the effects observed when these foods were administered through the tube or in the normal manner. A similar condition was observed with hard eggs. This was true, however, only for normal or hyperacid cases. In subacid cases the reaction of the stomach was so distinctly reduced that omission of the act of mastication showed marked differences from the results obtained when the food was chewed, whatever the nature of the food. When carbohydrates were taken, there was a marked deficit in the values for acids if the food was not chewed.

I. H. Coriat² discusses the question as to the **purpose of milk coagulation** by the milk-curdling ferment in gastric digestion. It has been shown that digestion of milk can take place in the entire absence of the milk-curdling ferment. Coriat's experiments in digesting milk with pepsin alone, pancreatin alone, and in other cases with these substances given with rennin, showed that there was more albumose and peptone formed when rennin was added to the mixture; in other words, that the coagulation of the milk by rennin aided digestion. The paracasein formed in coagulation seems therefore to be more digestible than the native casein, and the proteid found in the whey is already soluble to a certain extent. The increased production of albumose and peptone took place in both acid and alkaline media, pepsin being used in one case and pancreatin in the other. Coriat found that combined HCl does not coagulate milk unless it exceeds in bulk one-tenth the bulk of the milk used, while free HCl alone coagulates milk; rennin coagulates milk without the presence of HCl, but HCl or acid-albumin hastens coagulation by the rennin. He found that coagulation of milk with vegetable enzymes took place in the same conditions of temperature, acidity, and

¹ Zeit. f. diätet. u. physikal. Therap., Bd. IV, H. 6.

² Phila. Med. Jour., July 7 and 14, 1900.

amount as when rennin was used. He therefore thinks their action compares favorably with that of rennin.

Strauss¹ shows that the **osmotic pressure of the stomach-contents** is less than that of the blood. The regulation of the osmotic pressure of the stomach-contents serves the organism as a protective measure, which may prevent injury to the intestines, or prevent a sudden rise of the osmotic pressure of the tissue juices. Solutions of high molecular concentration, as a concentrated sugar solution and alcoholic drinks, can sometimes be used to dilute the stomach-contents or to ameliorate the absorption, but should be avoided in gastric motor insufficiency, as they hinder the motility by the increase of the fluids.

J. H. Kellogg,² in referring to the reports of the discovery of **molds in the stomach**, and the belief that they are very rare, states that in 7000 analyses he has found molds 457 times; the *Oidium lactis* is frequently introduced with milk, the *Aspergillus flavescens* and the *Aspergillus fumigatus* being apparently introduced with bread. In some cases they seemed to have an unfavorable effect upon existing gastric disturbance or actually produced disease.

L. Sansoni and L. Fornaca³ report the case of a girl of 19 who complained of gastric disturbance which appeared about 2 hours after meals, and consisted chiefly of distention of the stomach and such loud borborygmi that her occupation was interfered with, and she feared to go about in public. Microscopic and bacteriologic examination of her stomach-contents showed an almost **pure culture of a bacillus** which was decolorized by Gram's method, was facultatively anaerobic and aerobic, which grew well upon an ordinary culture medium, particularly when the medium contained glucose and milk-sugar, and also grew in acid media and in media containing a very large proportion of acid gastric juice. The most notable point about it was that it produced a large amount of gas, the gas consisting chiefly of hydrogen and carbon dioxid. The gases produced in the stomach were largely of the forms just mentioned; because of this and because the symptoms in the case occurred sooner than it was possible for ordinary fermentation to have occurred, and the ordinary fermentative bacteria were absent, the authors consider that the symptoms produced in the case were due to the presence of this organism.

H. Campbell,⁴ in opening a discussion on **diet in the treatment of disease**, referred to the fact that the food of civilized man is essentially concentrated and soft. The result is that constipation is very common because of the concentration; and the lack of bulk and the softness of the food lead to poor mastication and consequently to caries of the teeth, adenoids, and other changes in the mouth and nasopharynx. In continuing the discussion, D. Sommerville insisted that in dieting cases of gastric disease it is essential to make careful determinations of the chemie condition of the gastric contents. In hyperchlorhydria he believes that carbohydrates should be largely used. In tuberculosis of

¹ Wien. med. Woch., Nov. 10, 1900.

² Med. News, July 21, 1900.

³ Arch. f. Verdauungs-Krankh., Bd. VI, H. 4.

⁴ Brit. Med. Jour., Oct. 13, 1900.

the lungs there is a lack of relation between the appetite and the digestive power, and food should be given even beyond the point of satiation of the appetite. He and Mullick both advise the use of large quantities of easily digested proteids in fevers, and in other conditions in which there is a large waste of nitrogenous tissue. Hydrocarbons are also valuable in lessening tissue waste, and give opportunity for accumulation of albumins. Fevers are best treated by giving food in simple and easily digestible form and in a form which will readily be assimilated and also aid in flushing the tissues of products of metabolism.

L. L. Seaman¹ discusses the causation of the **diseases affecting the soldiers** in the tropics. He attributes the frequent and severe gastrointestinal disturbances largely to the irrational food supplied the soldiers. The quantity given he considers entirely too high, the average energy in caloric units being about 4450, while the average ration of the British soldier in temperate climates is only about 2800. The diet is also too rich in meat and other forms of food that tend to increase gastrointestinal disturbance. As compared with the rations of natives of the tropics, the ration of the United States soldier was found to contain an excess of about 6 grams of nitrogen per day, and about 180 grams of fat, while there was a deficiency of about 80 grams of carbohydrates. Seaman considers that dried and smoked meats may well be used, as they are to a certain extent disinfectants of the gastroenteric tract, and that they should largely replace fresh meat. Salted and tinned meats are objectionable; these cannot be used in large quantities as a rule. Carbohydrates should be used much more largely, and he believes that sugar can be used in much greater quantities than is ordinarily recommended, and that when on the march an amount of sugar equal to a large quantity of more bulky carbohydrates can readily be carried; larger quantities of sugar should be introduced into the ration. He would give only 10 ounces of fresh, dried, or smoked beef, 2 ounces of bacon, 12 of flour, 4 of rice, lentils, or maize, 14 ounces of green vegetables, 2 ounces of dried fruit, and 4 ounces of sugar, with chocolate, the whole representing about 3300 caloric units, and containing about 15 grams of nitrogen, 83 of fat, and 540 of carbohydrates. The bulkier carbohydrates should be replaced by sugar when the men are on the march.

E. E. Smith,² after an investigation of the **influence on digestion**, absorption, and metabolism of food prepared by the use of an **alum baking powder**, concludes that there was no unfavorable influence noted upon gastric secretion or upon absorption, and that the food prepared in this way seemed to have no unfavorable influence upon metabolism.

R. E. Williamson³ describes his results from the use of a **pure protein food** in 55 cases of various diseases. The substance employed was plasmon, and the diseases were gastrointestinal affections, anemias, intestinal carcinoma, and heart-disease. He found that nutrition was

¹ Med. Rec., Oct. 20, 1900.

² N. Y. Med. Jour., Oct. 27, 1900.

³ Lancet, Nov. 24, 1900.

likely to improve greatly under its use, and the food was usually taken well, even when there had been marked gastric disturbance.

A. Wirschubski¹ has investigated the **influence of fatty foods** on the secretion of HCl and pepsin in animals, and decides that fats decrease the gastric secretory functions and reduce the amount of HCl and pepsin.

C. S. Fisher² reports 4 cases of gastric disease in which gastro-enterostomy was carried out and the **gastric functions studied after operation**. In the first case pyloric obstruction and hyperacidity existed before operation, and persisted 14 months afterward, while the motor function had much improved and the size of the stomach had become decidedly less. Hyperacidity still persisted for 2 years after operation in the second case, the motor function and the size of the stomach in this instance also being much improved. In the third case, one which Fisher believes was primary functional hyperacidity with a consequent spasm of the pylorus and dilation, hyperacidity had been present at irregular times before the operation, and still persisted, while the other symptoms had improved. In the fourth case, which was one of neurasthenic atony, the operation caused the motility to improve, but the dilation remained, and the subacidity which was present before operation became worse.

K. Bornstein³ has carried on some metabolism experiments to determine the **influence of saccharin**, and believes that he has shown that it has an unfavorable influence upon digestion and absorption, as well as upon metabolism. The effect was not marked, but was in his opinion sufficient to make it necessary to establish careful limitations of the use of this substance, particularly in diabetes, when large amounts are not infrequently taken by patients. As an antifermentative it may properly be used in the gastrointestinal disturbances of adults or children, but it should be used as a drug, and with care. It is questionable still whether it has any diuretic effect sufficient to make it useful as a diuretic. [The results of other investigators have not been wholly in accord with those of Bornstein, but the general view of clinicians is that saccharin should be used with decided care.]

J. H. Musser,⁴ in discussing the **use and abuse of gastric lavage**, states that he does not use this procedure in more than 5% of the patients who show signs of gastric disease. He recommends gastric lavage in cases of atonic dilation with marked retention, in organic obstruction of the pylorus, in certain cases of gastric neurasthenia, of hysteria, and in some cases of chronic gastritis with subacidity. He has, however, been constantly reducing the number of cases in which he employs lavage, and has been depending more and more constantly upon regulation of the general hygiene of the patient's life and measures directed to the improvement of general health. He believes that the great majority of cases which show gastric symptoms are really suffering from more general disease, such as neurasthenia, anemia, and

¹ Bolnit. Gaz. Botkina, No. 26.

³ Zeit. f. klin. Med., Bd. XL, S. 208.

² Med. Rec., Sept. 8, 1900.

⁴ Therap. Gaz., Nov. 15, 1900.

general muscular weakness. If lavage is used at all, Musser considers that it should be done by the physician, and patients should not be allowed to carry it out themselves, as they are likely to use it unwisely and too frequently.

Dubois,¹ in discussing the **gastrointestinal disorders of nervous origin**, insists that there is too much tendency to consider the nervous symptoms so frequently seen mere coincidences in the course of the gastrointestinal trouble. He thinks that in many instances there is undoubtedly a relation of cause and effect between the nervous manifestations and the gastrointestinal disease, and that in this class of cases the functional disturbances of the gastroenteric tract are an evidence of the general lower tone of the nervous system, and an indication that the treatment should be directed toward the general condition rather than toward the nervous system.

GASTRITIS.

F. H. Murdoch² describes 5 cases of what he terms **chronic dyspeptic asthma**. The condition differs from the form of dyspeptic asthma commonly described in that there are no paroxysmal seizures, but a chronic tendency to shortness of breath on very slight exertion, without any evident abnormalities of the heart, lungs, or kidneys; the condition yielded to treatment of the gastrointestinal tract. The only complaint of the patients was shortness of breath; none of them complained of dyspeptic symptoms. In 3 of the cases there was achylia gastrica.

J. S. Green³ reports a case of **urticaria** which occurred in the tropics, and was so severe as to simulate angioneurotic edema. It occurred in a man of 23, who had gastrointestinal disturbance with an eruption of wheals which covered practically his whole person, the symptoms increasing, and being accompanied by much swelling. Purgation, restricted diet, and local application caused improvement after several days' treatment.

W. Jaworski⁴ directs attention to the difficulty in cases of simple gastric hypersecretion or in acid gastritis in overcoming the constipation that is usually present and which is one of the most distressing symptoms in many cases. Ordinary alkaline purges and mineral waters are ineffective. He recommends the use of what he calls milder and stronger **effervescent magnesia waters**, the first being made of 5 parts of magnesium carbonate, 1 part magnesium salicylate, and 1000 parts carbonic acid water. The stronger preparation is made with 10 parts magnesium carbonate, 5 parts sodium chlorid, and 5 parts carbonic acid water. He claims most satisfactory results from these preparations used coincidentally, the quantities of each being indicated by the case. They control the marked thirst, reduce the gastric acidity, and act as mild purges.

¹ Rev. de Méd., July 10, 1900.

³ Med. News, Sept. 8, 1900.

² N. Y. Med. Jour., Jan. 12, 1901.

⁴ Therap. Monatshefte, Jan., 1901.

Gilman Thompson,¹ in the treatment of chronic gastritis, insists upon a **strict dietetic regime**, rest before and after meals, which should be slowly and well masticated. A course of milk, fresh meat-juice, scraped beef, white of egg or granum is appropriate for severe cases, while mild cases do well on lean roast beef, tender rare beefsteak, chops or roast mutton with dry toast or stale bread, boiled rice, baked potato, spinach, shredded wheat, toasted soda crackers, thin dry ginger snaps, granose, zwieback, baked apples, orange-juice, baked custard, blanc-mange, eggs, soft-cooked or raw, and the soft parts of raw or stewed oysters. Foods to be prohibited are fried foods, twice-cooked meats, the coarser vegetables, sweets, pastry, cakes, puddings, and strong condiments. Exercise and hydrotherapy may be of use. Hydrochloric acid,—if there is a lack of gastric juice,—pancreatin and soda bicarbonate, silver nitrate, and tincture of nux vomica with gentian, cinchona, or cardamom before meals, are advised in suitable cases. Lavage or hot alkaline water taken before each meal is useful in treating fermentation and mucus.

SECRETORY CHANGES.

Hyperchlorhydria and Hypersecretion.—H. F. Hewes,² after a study of 48 cases of **uncomplicated hyperchlorhydria**, states that the most common symptom was a feeling of distress; other very frequent symptoms were eructation of gas, heart-burn, and pyrosis. Vomiting was present in only about one-third of the cases. Most of the cases showed relief of the symptoms after the use of alkalies. Headache and general nervousness were very common. He states that in about five-eighths of the cases a definite diagnosis cannot be made without chemie examination of the gastric contents. He agrees with others in believing that there is in some cases rather an abnormal sensitiveness of the stomach than an actual increase of the acid secreted, and that symptoms of hyperchlorhydria may be present without actual increase in the acidity. In the treatment of the condition he recommends the use of alkalies, giving a large amount of proteid food and limitation of the starches. The carbohydrates taken should be in the form of sugars or predigested starches. [There is still a decided difference of opinion concerning the diet. Personally, we have found contradictory results. Sometimes we have been more successful by proceeding upon the plan that proteids cause the greatest amount of secretory irritation, and therefore should be used only in limited amounts. At other times, and perhaps more frequently, we have had the same experience as Hewes.]

F. Riegel,³ in discussion of the **treatment of pain** in gastric conditions, states that in cases of hyperacidity and hypersecretion belladonna is much more valuable than morphia, because it controls the pain and at the same time reduces the secretion of gastric juice, and likewise causes a more or less complete temporary muscular paralysis

¹ Med. News, Jan. 12, 1901.

² Boston M. and S. Jour., Nov. 29, 1900.

³ Zeit. f. prakt. Aerzte, 1900, No. 17.

and thus overcomes spasm of the pylorus. The dose which he uses is about $\frac{1}{100}$ grain one to five times a day. Riegel believes that morphia, while it may in the beginning reduce the secretion, is likely to have the contrary effect if its use is persisted in for any considerable length of time. Animal experimentation shows that it often causes an increase in the secretion, and experiments on animals also show that a paralytic effect upon the muscles is frequently not observable.

A. Hirsch,¹ after some experimental work concerning the **influence of subcutaneous injection of morphia** upon the stomach, concludes that a dose of 1 centigram per kilo of body weight causes in dogs a complete stoppage of expulsion of gastric contents, which lasts for hours. This is caused by spasm of the pylorus, which is accompanied by a marked increase of peristalsis in the pars pylorica in case the stomach is not empty. The peristalsis is weaker if the stomach is empty. The fundus remains quiet. The secretion of HCl is in the beginning decreased, but later is increased. The early decrease is due to the excretion of the HCl by the gastric mucous membrane into the stomach. The subsequent increase is probably due to irritation of the central origin. The pyloric spasm and the excitation of peristalsis are thought to be due to stimulation of the centers in the corpora quadrigemina. Increase of the dose causes an increase in the effects. Subcutaneous injections have a more marked effect than the use of the drug by the mouth. When food was given with morphia by the mouth, there was an increase or decrease in the results, depending upon the rapidity or slowness of absorption of the food. Atropin caused a similar disturbance, but it was less marked; the HCl secretion was completely absent in the first hour, but it became normal after about 6 hours.

P. Edel² discusses the work previously reported by Simon concerning the **influence of artificial sweating** upon the secretion of gastric juice. He notes that Riegel's results with pilocarpin are contrary to those of Simon, and describes his own results with sweat baths. He found in many cases no change in the gastric secretion, but in the majority of cases it was increased rather than diminished. His work was done on normal persons, and he believes it is more satisfactory than that of Simon, and that probably if there is any distinct influence exerted upon the gastric juice by baths it is evidenced in an increase of the acidity. As to Simon's theory that there is a reduction of the chlorids of the fluids and tissues through the sweat baths, he states that this is mere supposition, and that it seems improbable, because Simon in no way controlled the intake of chlorids after the baths, and one naturally replaces the loss of chlorids at once by taking an excessive amount unless the intake is controlled.

A. Simon,³ in reply to Edel's article on the influence of baths upon the gastric secretion, insists upon the fact that his observations and those of Gruzdiev indicated with absolute positiveness that the baths **decreased**

¹ Centralbl. f. innere Med., Jan. 12, 1901.

² Zeit. f. klin. Med., Bd. XLII, H. 1 u. 2.

³ Zeit. f. klin. Med., Bd. XLII, H. 3 u. 4.

the acidity of the gastric contents, but that this was only marked in cases of hyperacidity. After analyzing Edel's tables he reaches the conclusion that a reduction in the acidity was seen in his cases also in practically all the instances of hyperacidity which he included in his article. He also insists that the diet in these cases was a constant one, and that therefore his remarks concerning the chlorids were justified. [We have observed marked improvement in instances of hyperchlorhydria after using sweat baths for a short time, but have failed to observe any permanent influence, and indeed the influence seemed even to grow less marked. The procedure probably has some value, but the best results we have seen have, aside from the use of dietetics and other general measures, been due to the use of atropin.]

Achylia Gastrica.—H. Strauss,¹ after some investigations concerning **absorption and metabolism** in cases of gastric aepsia, states that sugar is well absorbed by the stomach, while fat is scarcely at all absorbed. There was constant secretion of water from the gastric mucous membrane in spite of the absence of the essential gastric secretion. This indicated that the secretory function was not absolutely lost. The absorption of the nitrogenous foods and of the fat by the intestine was not disturbed excepting when there was diarrhea, and there was no evidence of a pathologic disturbance of metabolism. The excretion of uric acid, ammonia, P_2O_5 , and NaCl showed nothing of importance. The amount of urobilin in the urine was practically always increased, and the ethereal sulphates were found at about the upper limit of normal figures. The relation between aepsia gastrica and pernicious anemia is considered by Strauss to be a very doubtful one. He thinks that there are as yet no definite reasons, excepting theoretic ones, for the belief that atrophy of the gastrointestinal tract can produce pernicious anemia, but thinks that this question needs further investigation.

F. H. Murdoch² reports a case of achylia gastrica in a man of 54, in which it was believed that **practically complete achylia** had been present for about 3 years, at least, there was then a sudden return of the gastric secretion, free HCl being subsequently found in about normal amounts. No treatment had been used for some time before the return of the gastric secretion.

Gastric Crises.—R. Pauly and R. Pouly³ describe a case of **syringomyelia** which was complicated by gastric crises, and direct attention to the importance of this observation in relation to the diagnosis of locomotor ataxia. This man presented lightning pains as well as the gastric crises, but disturbance of the pain and temperature senses was present, and the knee-jerk was exaggerated on one side and normal on the other; station was good, and the Argyll-Robertson pupil was absent, so that a diagnosis of locomotor ataxia seemed to be unjustified.

¹ Zeit. f. klin. Med., Bd. XLI, S. 280. ² Phila. Med. Jour., Dec. 29, 1900.

³ Rev. de Méd., Dec. 10, 1900.

GASTRIC HEMORRHAGE.

H. Hirschfeld¹ reports a case of **cachexia** in a woman of 77, who had been in ill health for some time, and who had repeatedly **vomited blood**. She died 10 days after the last hemorrhage in a condition of general marasmus. The postmortem examination showed mild gastritis and some points of pigmentation of the gastric mucosa which had been the seat of hemorrhages some time before, but there was no evident source of the recent hemorrhages. The woman was the subject of advanced arteriosclerosis, but there was no microscopic investigation of the vessels of the stomach to determine whether such changes in these vessels had any relation to the hemorrhages.

Lancereaux² discusses **neuropathic hemorrhages** from the digestive organs, mentioning one case in a man of 42 who had had repeated hematemesis and melena, and who finally died of intoxication with turpentine. The digestive organs showed no changes sufficient to explain the hemorrhage. Lancereaux notes another case of repeated hemorrhages from the mouth without any changes in the buccal cavity explaining their origin. He refers to a series of similar observations reported by others, in which hemorrhages occurred from various portions of the gastrointestinal tract. He notes the difficulty in distinguishing neuropathic hemorrhages from those due to organic disease. The latter often occur very suddenly without prodromes, and one is likely to find other signs of organic disease, while neuropathic hemorrhages usually have neurotic prodromes and are associated with an entire absence of signs of distinct organic disease. The neurotic forms seldom cause death, and are of importance only because they are likely to be repeated.

O. O. F. Greenbaum³ believes that **suprarenal extract** is a valuable hemostatic in hemorrhage of the stomach. He considers that small doses should be used, but that they should be repeated at frequent intervals, as the action of the remedy is not protracted. He thinks it is more valuable than iron preparations, as it does not coagulate the blood, but merely causes contraction of the vessels.

GASTRIC ULCER.

J. F. Payne,⁴ in opening a discussion on **the problems in gastric ulcer**, stated that he considered the following questions still unsolved: (1) Is the frequency of gastric ulcer increasing? (2) Is gastric ulcer directly related to hyperacidity, and can the presence of hyperacidity be ascertained in such cases without danger to the patients? (3) Are there satisfactory means in nonfatal cases of making a diagnosis of gastric ulcer, particularly when hematemesis has occurred? (4) Is there an acute form of gastric ulcer which differs from the chronic form?

¹ Fortschritte der Med., 1900, No. 31.

² Bull. de l'Acad. de Méd., Dec. 4, 1900.

³ Brit. Med. Jour., Nov. 3, 1900.

⁴ Brit. Med. Jour., Sept. 29, 1900.

(5) Is the cause of gastric ulcer as yet satisfactorily known? (6) Is gastric ulcer, as is commonly supposed, exceedingly rare in the upper and middle classes? (7) Should the ingestion of even water by the mouth be entirely prohibited during rectal feeding? (8) Does acetoneuria occur frequently with rectal feeding? (Acetoneuria may certainly be expected because of the marked metabolic tissue loss that occurs in rectal feeding as the result of insufficient nourishment.) In discussion, W. Gordon stated his belief that gastric ulcer is best explained by the microbic theory. He insisted that all ulcers should be studied bacteriologically. W. Calwell insisted upon rigid treatment of every case that is suspected of being one of gastric ulcer, rest in bed and absolute milk diet being insisted upon. He believed that in some instances rents in the coating of the stomach are mistaken for perforations. Julia Cock described a case in which there was an appearance of perforation and subphrenic abscess resulting from gastric ulcer, but the autopsy showed pneumonia and pleurisy with marked involvement of the diaphragmatic pleura and adhesions between the diaphragm and the base of the lung. Gastric ulcer was absent. S. Low reported his results from the management of ulcer and other irritable conditions of the stomach with mucin. The preparation used was produced from animal bile, and occurs in the form of a powder which is practically without taste or odor. He gives 10 grains before meals with an equal part of bicarbonate of soda. He found that this reduced the pain greatly and caused regular action of the bowels. The effect was, in his belief, to form a coating over the irritated mucous membrane, and thus both to soothe and protect the membrane. In dieting cases of ulcer he uses food which has a similar influence—namely, jellies made of calves' feet, mutton, chicken, and thin corn flour, often also using a jujube paste made from fresh marshmallows.

M. J. L. Faure¹ directs attention to the occurrence of **thoracic pain in peritonitis** following perforation of the stomach. In one case, in which the pain was sharp and severe, it radiated from the region of the stomach in the direction of the left shoulder. Laparotomy in this case showed the lesser peritoneal cavity to be filled with pus, the result of the perforation of the stomach. In the second case sharp pain was complained of in the region between the shoulders; and this case also proved to be perforation of the stomach with general peritonitis. Faure insists upon the frequent occurrence of thoracic pains either in the intra-scapular region or about either scapula, and he believes that the occurrence of this symptom is of much importance in establishing the diagnosis, and that it particularly points toward perforation of the stomach.

Treatment.—G. Gluzinski² considers that some attention should be directed to the **prophylaxis of gastric ulcer**, particularly to the avoidance of marked dietetic errors and the control of severe vomiting, to the prevention of the use of irritating drinks, alcohol, etc., by persons who are predisposed to ulcer, such as chlorotic subjects, those with disturbance of the portal or general circulation, those suffering from

¹ La Semaine Méd., Jan. 23, 1901.

² Wien. klin. Woch., 1900, S. 49.

infections, and those whose occupations predispose them to the disease. In the treatment of the condition Gluzinski considers that the common error is to dismiss the case far too soon; he thinks the treatment should be continued for a much longer time than is usual. Especial attention should be given to cases of gastrosuccorhea. Care should be used in dieting these cases, and the stagnant contents of the stomach should in all cases be frequently removed by lavage. There is in such cases usually some stenosis of the pylorus, and if this proves to be of a mechanical nature, and pronounced in degree, the sooner the patient is turned over to the surgeon, the better. As to hemorrhage, he believes that with acute onset of the bleeding internal treatment will cure the greater number of the cases; but if there is a tendency to repetition of the hemorrhages, surgical aid should usually be called in.

G. Kelling¹ gives a general discussion of the **surgery of chronic nonmalignant gastric diseases**. He devotes a considerable portion of his article to a discussion of the propriety of interfering surgically in cases of ulcer which are resistant to other forms of treatment. If proper medicinal treatment does not result in the cure of the gastric ulcer, and of the secondary disturbances produced by the ulcer, it should be recognized that there are a number of dangers likely to be encountered, among the most important of which are hemorrhage, severe perigastritis, carcinomatous change, and a disturbance of general nutrition, making the subject a victim of chronic ill health and particularly liable to changes such as tuberculous. Kelling believes that these dangers are much greater than those incident to the surgical measures necessary for relief, and that if thorough and persistent treatment does not result in relief, surgical measures are often indicated, the most important of which are pyloroplasty, gastroenterostomy, and in case the local conditions are favorable, removal of the ulcerated area. Gastropstosis he does not consider to be a condition which should be operated upon unless the abdominal walls are very lax and the operation is intended to overcome this, or there is marked disturbance of gastric motility. Operations intended to fix the stomach in its place will not, in his belief, result in permanent success. He discusses a number of technical points concerning the surgical measures to be adopted.

L. Metzger² discusses the **influence of nutritive enemas** on the secretion of gastric juice. He used enemas containing milk and eggs, and others containing bouillon and red wine. He found that there was a marked difference in the effects of these two forms of enemas upon the gastric juice, and that therefore any alteration in the gastric juice was not due merely to the water absorbed. The milk and egg enemas had no distinct influence upon the gastric juice, while there was a distinct secretion of strongly acid juice after the use of the bouillon and red wine enemas. When bouillon or red wine was used alone it was found that the first had no distinct influence, while the latter caused marked gastric secretion. These results were obtained in both men and

¹ Arch. f. Verdauungs-Krankh., Bd. VI, H. 4.

² Münch. med. Woch., 1900, No. 45.

dogs. The secretion is considered by Metzger to be probably produced through reflex action.

C. A. Ewald¹ discusses **extrabuccal feeding**, dividing it into three forms—nutritive enemas, subcutaneous or intravenous injections, and feeding through a gastric fistula. He does not consider that any method is sufficient of itself to support life over a long period, but he considers it possible by these means to maintain a nutritive equilibrium for a time. In using rectal feeding predigested mixtures should be given, and he advises an enema about like the following: Two tablespoonfuls of wheat flour stirred in 150 cc. of milk or of warm water, to which 2 eggs are added, a pinch of salt, and 50 to 100 cc. of a solution of glucose of 15% or 20% strength; a small amount of alcohol, best in the form of a light wine, may also be used. For subcutaneous nourishment the oils have proved best, butter fat and olive oil being the most satisfactory, 100 to 150 cc. being injected at one sitting, the injection, however, being made very slowly. Feeding through the gastric fistula may support nutritive equilibrium if there is no malignant disease. Rectal feeding has a marked advantage over subcutaneous feeding in that large amounts of water, which are usually demanded, may be introduced easily in this way.

G. G. Sears² states that in his experience with **rectal feeding** in gastric ulcer he has found that large amounts of food may be introduced without causing greater intolerance than is produced by smaller injections. The larger amount of fluid that is injected alleviates thirst and promotes comfort. He gives a large enema of plain water in the morning, which is retained if possible. An hour later, if there has been no bowel movement, an enema of soap-suds is given to cleanse the rectum, and a nutrient enema, peptonized, is then given, the patient's buttocks being raised and a tube being pushed well up into the sigmoid flexure. The injection is made slowly, and afterward a pad is applied to restrain efforts at expulsion. The enemas are repeated every 6 hours. Sears does not claim that all the necessary nourishment can be given in this way, but he notes one case in which there was improvement in anemia and a gain in weight, and he thinks that it is possible to prevent patients from losing ground. [Undoubtedly rectal feeding is better than nothing. It should be recognized, however, that there is no good proof that proteids are absorbed from the large bowel and that fats are certainly absorbed in small amounts only. That there may be clinical and chemie evidence of extremely poor nutrition when considerable amounts of food are being given has been previously insisted upon by one of us. It is unwise to depend upon rectal feeding unless actually obliged to do so.]

EPIGASTRIC AND DIAPHRAGMATIC HERNIA.

G. Kelling³ observed that besides true **epigastric hernia** there may be observed small openings in the fascia through which small portions

¹ Med. Rec., Aug. 18, 1900.

² Boston M. and S. Jour., Nov. 1, 1900.

³ Wien. med. Woch., 1900, No. 40.

of peritoneal fat escape, and which, in spite of their small size, produce severe nervous disturbance of the stomach. He describes 2 such cases in which operative removal of the small fat nodules completely cured severe gastric disturbance which resembled ulcer. Since a vessel or vessels usually pass through the opening in the fascia, Kelling considers that the gastric disturbance is reflex, and the result of the irritation of the nerves accompanying the vessel. Kelling also directs attention to the fact that there is a nervous point of tenderness often found in the region of the pylorus and gall-bladder. It is of importance to remember this in the diagnosis of ulcer of the stomach or duodenum, and in cholelithiasis.

C. Hirsch¹ describes a case of **diaphragmatic hernia** which was **diagnosed during life**, the diagnosis depending largely upon radioscopic examination. The most important points in the diagnosis, and those which distinguished the condition from pneumothorax, were the frequent changes in the signs, the relatively good condition of the patient, and the fact that there had been gastric distress from childhood. It is also important that after partaking freely of food there was a sense of pressure and pain in the left thorax, and this was increased by inflation of the stomach. There was a dextrocardia present, which Hirsch attributes to the hernia of the abdominal organs and consequent compression of the heart toward the right during an early period in life. He considers it quite possible that this cause may be frequently discovered in similar cases of isolated dextrocardia.

CHANGES IN FORM AND POSITION.

Rostoski,² after investigating a large series of cases, comes to the conclusion that gastroposis is far from being a constant condition in **chlorosis**, and cannot by any means be considered to be the only cause of this condition. Of 50 patients, he found that but one-fourth had gastroposis. He did discover, however, that when corsets had been worn before the fourteenth year of life gastroposis was very common, while it bore no relation to the wearing of corsets if they were first used after the fourteenth year. Concerning the demonstration of gastroposis, he considers that it is easy to obtain results that are deceptive when inflation is used if the course of the transverse colon is not kept in mind.

J. R. Arneill³ discusses enteroptosis. He reviews very briefly the history of this condition and then refers to his own studies of cases observed in out-patient and hospital practice during the last 8 years. Referring to the method of examination for gastroposis, he advises the use of inflation with carbonic acid gas evolved from 7 grams of bicarbonate of soda and 6 grams of tartaric acid. He has never had any unpleasant consequences from this, though in a few cases of marked dilation the dose was not sufficient. In one case he had to double the dose. His preference for this method is based upon the fact that

¹ Münch. med. Woch., 1900, No. 29.

² Münch. med. Woch., 1900, No. 40.

³ Am. Jour. Med. Sci., Apr., 1901.

patients object to the use of stomach-tubes. The following table shows the frequency of the condition as discovered in his routine work. The small number of cases seen between October, 1892, and December, 1896, as compared with a later period, he explains by his greater attention to the discovery of this condition since that date. In his **series of 80 cases**, 69 were women and 11 men. In 24 cases both kidneys were dislocated, the right usually more than the left. In 33 cases the right kidney alone was dislocated. In some only the lower half was palpable on deep breathing. In 4 cases the left kidney alone was dislocated, and in 7 cases no notes were recorded. Recently he has investigated Stiller's phenomenon, that of the floating tenth rib. In 8 cases this was distinctly present. In 7 there was a membranous attachment. In 65 cases no notes were recorded. In 69 of the 80 cases gastropotosis was present, the dislocation being considerable in 28, so that the entire organ lay below the umbilicus. In 41 cases the prolapse was moderate. All but 12 of the cases were distended with acid and soda. In 3 of the 80 cases there was no dislocation of the stomach, and in 8 there were no notes. Analysis of the stomach-contents was made in 48 cases, in 36 of which there was a total acidity of 50 or below, in 2 between 50 and 60, in 4 between 60 and 70, in 3 between 70 and 80, and in 3 between 80 and 90. In 32 of the 80 cases there was no reference to stomach analysis. Examinations of the blood were made in 23 cases. Of these, 9 showed a chlorotic condition, 13 more or less anemia, but not chlorotic, and 1 case was normal. The symptoms in these cases were extremely variable, but the author does not refer especially to this point. [Stiller's phenomenon has been pretty conclusively shown to be of no serious importance in the diagnosis of either gastropotosis or neurasthenia. It is common in normal persons and in those with gastric affections other than gastropotosis, and also in other diseases. It occurs very frequently in gastropotosis and neurasthenics because such persons have relaxed tissues, and hence the condition is likely to be more marked in them and more easily demonstrated.]

J. D. Steele ¹ records a case of **gastropotosis with jaundice**. The patient was a woman of 39 years of age, who first suffered with severe abdominal pain in 1897. The pain was in the right half of the abdomen and was attended with severe vomiting and prostration. Gradually it spread to the whole abdomen and was accompanied by tenderness on pressure. Later she had occasional pains with diarrhea and distention after eating, and in October, 1898, there was a severe attack, with violent vomiting lasting 2 months. At this time the jaundice developed and she lost 25 pounds in weight. On admission to the hospital somewhat later there was bile in the urine and jaundice. The abdominal walls were relaxed, the epigastrium flattened, the liver not enlarged, and the kidneys in normal position. There was some anemia, and a considerable degree of gastropotosis was discovered on inflation of the stomach. The upper border was at the umbilicus, the lower halfway between the umbilicus and the pubis. The gastric juice was practically normal. In-

¹ Univ. Med. Mag., Feb., 1901.

flation of the colon showed that it passed across the abdomen at the level of the umbilicus. Treatment with a belt and pad relieved the symptoms, including the jaundice.

Volvulus of the Stomach.—Wiesinger¹ reports a most remarkable case which proved to be volvulus of the stomach which had produced **complete occlusion of the cardia and pylorus**, and had also caused **acute fat necrosis**. The patient, a man of 41, was taken suddenly ill after a dietetic indiscretion. He had previously been in entire health. His symptoms were vomiting, constipation, pain, and abdominal distention, and when he was admitted to the hospital on the fourth day of his illness there was a large mass in the upper part of his abdomen, the nature of which was entirely obscure; but it was suspected even after opening the abdomen, that it was a pancreatic cyst. Puncture showed, however, that it was the stomach enormously distended with fluid, about 4 liters being withdrawn. Further investigation showed that the pancreas was healthy, excepting perhaps for some enlargement. The stomach was turned on its axis through about a half circle and fixed in this position by adhesions, the cardia and pylorus having been completely occluded, the stomach thus becoming enormously distended by the fluid secreted into it. The adhesions were loosened and the stomach placed in position; the man became entirely well. There was widespread fat necrosis observed during the progress of the operation, and this was attributed to pressure of the distended stomach upon the pancreas or the duct of the pancreas. The case is remarkable because of the occurrence of complete recovery after acute fat necrosis. The volvulus was attributed to the displacement of the colon above the stomach, resulting from abnormal length of the mesocolon. As a consequence of this, the stomach had lost the fixation which the colon usually gives it, and had probably at first become partially twisted, the volvulus being afterward increased in severity by secretion of large amounts of fluid into the stomach.

Dilation.—A. Heine² reports the case of a woman of 34 who on the morning after drinking somewhat immoderately of alcoholics was taken with pain in the abdomen, dizziness, vomiting, and diarrhea. Examination showed an **acute dilation** of the stomach, the greater curvature being a hand's breadth under the umbilicus. Lavage was undertaken twice a day, the diet carefully restricted, and the patient was well after 12 days, the greater curvature then being found a finger's breadth above the umbilicus. Acute dilation of the stomach is not frequently discussed in text-books. It is often the result of a central paralysis from shock, etc., or may follow stenosis of the pylorus or duodenum. If the condition is recognized early and lavage undertaken at once and the diet properly restricted, cure is likely to be obtained soon; but unless treatment is undertaken rapidly, collapse is likely to follow. If improvement is not soon observed, operation should be considered.

A. Martinet³ reports a case of chronic gastric stasis in which the

¹ Deut. med. Woch., Feb. 7, 1901.

² Wien. med. Woch., 1900, No. 31.

³ La Presse Méd., Jan. 2, 1901.

symptoms were greatly **relieved by lying on the right side**, but were markedly increased by lying on the left. Martinet believes that the improvement while lying on the right side was due to the fact that this brought the contents of the stomach toward the pylorus and allowed of their passage into the intestine, while when lying on the left side this was interfered with.

Werner¹ recommends **iodipin** in the diagnosis of obstruction of the pylorus or marked motor insufficiency, when it is inadvisable to use the stomach-tube. He also thinks that the very early appearance of the iodine reaction after taking iodipin (*i. e.*, its appearance in from 15 to 20 minutes) indicates pyloric insufficiency; while if the reaction occurs only after an extremely prolonged period it may prove to be of value as an indication of obstruction of the pancreatic duct or of widespread reduction of the absorptive power of the intestine. [The absence of the reaction, or its appearance only after a long time, might offer some aid in indicating the existence of either severe intestinal or pancreatic disease or biliary obstruction. If, however, it should be desired to make a definite diagnosis between these two conditions, the reaction would be useless.]

L. Ferrannini² describes an interesting case of **tetany** which occurred in a patient who had gastrosuccorrrhea and dilation of the stomach. The tetany came on after protracted vomiting and ended in death. Stenosis of the pylorus was absent, and added evidence that Reichmann's disease can occur without pyloric stenosis. Ferrannini believes that the histologic changes which he observed in this case show that Reichmann's disease is not in all cases primarily due to gastritis. The changes could be followed throughout various stages. In all the earlier stages the alterations were limited to the parenchyma of the glands, and the interstitial tissue was uninvolved. In the beginning there was some swelling of the parietal cells and increase in their number, with dilation of the fundus of the glands and the outlets. These changes became very marked; the principal cells became shrunken and reduced in number, and finally the glands seemed to consist chiefly of enormous parietal cells so swollen as practically to block the outlet, the fundus of the glands undergoing moderate cystic enlargement; the interstitial tissue showed slight changes with moderate advance of the gland-lesions and more marked changes later, the interstitial gastritis seeming to take its origin from the mucous surface of the stomach. Ferrannini believes that this indicates that the process begins as a functional excitation of the HCl secreting glands, and that the gastritis is secondary. A gastritis would not limit itself for so long purely to the parenchyma of the organ, and the inflammatory changes seemed to be the result of irritation of the surface of the stomach by the excess of HCl and the retention of food, the latter probably resulting from pyloric spasm following the irritation of the excessively acid stomach-contents. He found in this case very marked changes in the central nervous system, particularly in the medulla and cervical cord.

¹ Wien. klin. Woch., 1900, No. 7.

² Centralbl. f. innere Med., Jan. 5, 1901.

One of the most important and striking changes was a marked widening of the pericellular spaces; and the cells, particularly in Clarke's column, were deformed, being chiefly oval in shape; the cell membrane was thickened; there was marked chromatolysis, particularly about the nucleus, though sometimes general; there was a striking deposit of yellow pigment; oftentimes vacuoles were formed in the cell protoplasm; the nucleus was frequently deformed and displaced toward the periphery; the nuclear membrane was thickened. These changes point strongly toward **intoxication as the cause of tetany**, and Ferrannini believes that the intoxication comes from the stomach itself, and that the reason that tetany so frequently follows vomiting is that the partial or complete emptying of the stomach makes it much easier to absorb toxic matter, just as absorption very readily occurs from the pleura or peritoneum after partial removal of the exudate.

H. Ury¹ describes a typical case of gastric tetany, and another case in which the symptoms resembled tetany to some extent, but were not typical and characteristic. After reviewing some of the literature on the question, he decides that there are two forms of spasm in gastric disease, one of them being true tetany and almost invariably fatal, unless treated very early, the other being tetanoid spasms and not associated with a specially severe mortality. It is the latter cases, he believes, that are often reported as gastric tetany with recovery. If characteristic symptoms of tetany do appear in gastric dilation and improve, one **should be prepared to operate** on the least suggestion of another attack, as otherwise the cases are almost invariably fatal, rarely withstanding a repetition of the attack.

CARCINOMA OF THE STOMACH.

J. Boas² reports **statistics of 200 cases** of cancer of the esophagus, stomach, and intestines. The author does not put much worth in heredity as an etiologic factor, but believes cohabitation may have some causal influence; and prophylactic measures in regard to the eating and drinking utensils and the secretions and excretions of those afflicted are advised.

R. Schütz³ describes a **peculiar case of carcinoma** of the stomach which occurred in an old woman whose chief complaints were dysphagia and weakness, with severe emaciation. She had no regurgitation of food, and an ordinary stomach-tube was passed through the esophagus without difficulty. The diagnosis was believed to be carcinoma of the pylorus, but dilation of the stomach was absent, and the diagnosis seemed questionable. The autopsy disclosed a curious condition. The whole stomach was involved by a medullary carcinoma and had become transformed into a straight tube, and adhesions had caused the organ to assume a vertical position. This position, together with motor weakness of the stomach, largely explained the obstruction to the passage of food;

¹ Deut. med. Woch., July 19 and 26, 1900. ² Wien. med. Woch., Oct. 13, 1900.

³ Deut. med. Woch., Aug. 16, 1900.

the esophagus also in its lower portion was weakened and somewhat dilated owing to the dysphagia. A similar case has been reported by Rosenheim. Schütz thinks that if there is absence of regurgitation, and upon passing the sound no evidences of decided stagnation in the esophagus, but there are severe signs of stenosis, there should be a suspicion of the condition described in this case. He thinks that if a diagnosis could be made it might be possible to introduce a tube into the bowel through the pylorus and provide some nourishment for the patient in this way.

Schmidt,¹ in discussing the bacilli found in the stomach, particularly notes certain points concerning the **Oppler-Boas bacillus**, and especially directs attention to the fact that the addition of blood to stroke cultures made from carcinomatous gastric contents resulted in the free growth of these bacilli, and he thinks that their absence in benign gastric disease may to a considerable extent be explained by the absence of admixture of blood with the stomach-contents in these cases. The other factors which favor their appearance in carcinoma are stagnation, reduction or absence of HCl, absence of ferments, the partial destruction of the gastric mucous membrane, and consequent irregularities of the surface. He notes, however, that there are pseudolactic acid bacilli which can easily be confused with the Oppler-Boas bacilli by superficial examination. In carcinomatous disease of the stomach he has also found under some circumstances a very free growth of colon bacilli without any fistula between the stomach and intestines.

E. Jürgensen² reports 1 case of carcinoma of the stomach in which, besides the fact that the **secretion of HCl persisted** until shortly before death, there was made the interesting observation that the daily amount of urine was extremely variable, and at times the secretion was practically absent. When the secretion was greatly reduced, the patient was markedly somnolent, the reflexes were decreased, and there was decided contraction of the pupils. The rectal administration of large amounts of water together with hypodermoclysis caused coincidently an increase of the secretion of urine and disappearance of the symptoms noted. Jürgensen therefore concluded that the **symptoms were due to poverty of fluids** in the tissues. He also notes that in another case of carcinoma irregular fever of an intermitting character occurred. During the occurrence of fever the patient frequently showed blood in the vomit, and decided pain and tenderness over the mass, an evidence, to his mind, that during these attacks of fever there was breakdown of the tumor. He therefore considered that the fever was due to absorption of products of the tumor-destruction. Even when the patient was free from fever there was a decided diazo reaction in the urine, and the pulse was unduly rapid. These symptoms were also thought to be due to a more or less continuous **absorption of toxic material** from the tumor.

Rütimeyer³ states that in 86 cases of gastric carcinoma he found in

¹ Wien. klin. Woch., 1900, No. 2. ² Deut. Arch. f. klin. Med., Bd. LVIII, H. 5 u. 6.

³ Correspondenzbl. f. schweiz. Aerzte, No. 21 u. 22, 1900.

14 instances **free HCl in the gastric contents**. This percentage of its occurrence (16) is rather higher than that ordinarily given. It is notable that 6 of the 14 cases seemed from their history and other signs to have been developed on the basis of old ulcers, while in the other cases this point was uncertain. Free HCl was found present even when death was imminent, and when the tumor growth was very advanced. A lactic acid reaction was obtained in 87%, and the Oppler-Boas bacilli were found in 80%. In 3 cases carcinoma was observed in very young persons, the patients being respectively 14, 19, and 23 years of age. Rostowski notes in an abstract of this article¹ that he had recently observed a case in a patient of 16, in which a diagnosis of carcinoma was made during life and was confirmed by autopsy.

Krokiewicz² has investigated the condition of the **blood in cases of carcinoma** and has found, as have Henry, Stengel, and others, that the corpuscular count is higher than the appearances of the patient and the degree of cachexia would indicate. The explanation of this may be the repeated vomiting in the cases of gastric carcinoma, though the author suggests **metastases to the peritoneum** as the cause.

C. Douglas,³ in discussing **digestion leukocytosis** in carcinoma of the stomach, directs attention to the fact that it has been well shown that digestion leukocytosis may occur in carcinoma of the stomach, and that this method of diagnosis is therefore a very uncertain one. He reports 11 cases studied in this way, and found that digestion leukocytosis was present in 4 and inconstantly seen in 1.

SARCOMA OF THE STOMACH.

G. Dock⁴ describes a case of sarcoma of the stomach. The diagnosis had been dilation of the stomach from stenosis of the pylorus, the nature of the cause being somewhat in doubt. The long duration of the case and the absence of definite signs of malignancy made the existence of cancer seem somewhat questionable. On operation a mass was found at the pyloric region, and about one-third of the stomach and a portion of the duodenum were removed. A good recovery followed the operation. Microscopic examination of the tumor showed it to be a lymphosarcoma. Dock finds that sarcoma of the stomach has **rarely been diagnosed** during life. Enlargement of the spleen and of the lymph-follicles of the tongue sometimes occurs in later stages, but in the earlier stages there are no specific symptoms. If a tumor is present it will usually be diagnosed carcinoma.

MYOMA OF THE STOMACH.

Caminiti⁵ reports a case of a small **myoma of the pylorus**, which had caused no lesion of the mucous membrane, but which had caused obstruction of the pylorus, and a subsequent marked gastrectasia. He

¹ Centralbl. f. innere Med., Jan. 12, 1901, S. 52.

² Arch. f. Verdauungs-Krankh., Bd. vi, S. 25.

⁴ Jour. Am. Med. Assoc., July 21, 1900.

³ Brit. Med. Jour., Mar. 16, 1901.

⁵ Il Policlinico, Dec. 15, 1900.

refers to the statistics of Virchow and Steiner, and collected 23 previous instances of myoma of the stomach, 14 of which developed toward the inner surface.

APPARENT TUMORS OF THE ABDOMEN.

M. Einhorn¹ presents a paper on apparent tumors of the abdomen, first directing attention to the fact that this subject has been but little discussed. The apparent tumors which he discusses are not caused by the prolapse of any whole organ, and they are not phantom tumors, as this term is commonly used; that is, they are not due to meteorism. The masses under discussion are found in the epigastrium or in the right or left hypochondrium. They vary between the size of a hen's egg and a man's fist. They are of smooth surface, and slight percussion always elicits dullness. In 6045 cases examined by Einhorn in about 3½ years, 42 instances of apparent tumor were observed, 34 of which occurred in women. A series of these cases is reported in full. The tendency was for the attending physician to diagnose the condition as carcinoma. The cause is to be considered to be prolapse of the left lobe of the liver, exposure and thickening of the abdominal aorta, and local hypertrophy of the abdominal muscles, or possibly adhesions around the small curvature of the stomach. No opportunity for autopsy occurred in any of the cases. In discussing the diagnosis he states that the mass may be determined to be the left lobe of the liver if it is directly below the ensiform process, and there is tympany above, where the liver should normally be. If it is the aorta, the mass will have an elongated shape and will pulsate strongly. In local hypertrophies of the abdominal muscles the resistance runs horizontally, and is from 1 to 1½ inches in width and from 2 to 3 inches in length; it is superficial, has a flat smooth surface, and is usually either to the right or the left of the linea alba. Adhesions of the stomach are somewhat difficult to diagnose. They do not show the characteristic distinctions of the other forms before mentioned, and the resistance is usually comparatively slight and deep. The chief distinctions of these apparent tumors from real neoplasms are the fact that they have a smooth surface without nodules, that they vary greatly in distinctness, and that they are usually associated with enteroptosis. The diagnosis is commonly easy, but may be exceedingly difficult. Another point of some importance is that malnutrition in malignant neoplasm is usually going on actively at the time, while in apparent tumor, if malnutrition exists, as it frequently does, it has commonly been of prolonged course and has developed gradually. In treatment Einhorn particularly insists upon two points: first, that the patient's attention should be directed away from the mass, and second, the full quantity of food should be taken in order to improve the nutrition.

¹ Med. Rec., Nov. 24, 1900.

DISEASES OF THE INTESTINES.

THE EXAMINATION OF THE FECES.

I. Boas¹ describes an instrument which he has had made for the separation of the **solid and fluid elements of the feces** in order to determine better the presence of mucus and other abnormal constituents, such as pieces of meat and the like.

L. C. Kersbergen² doubts the value of Schmidt's **fermentation method** of examining the feces. This early fermentation of the feces he finds sometimes occurs very rapidly and sometimes is absent in the same individual under the same circumstances, and he does not consider the sign to be present more frequently in persons with intestinal disturbance than in normal individuals. He does not believe that a change in the amount of diastatic ferment is the cause of this variable condition, since such a ferment was always present. He believes it is due to changes in the bacterial flora of the intestine. He finds that there are often in the feces various forms of bacteria which produce fermentation of starches (a fact which is denied by Strasburger), and colon bacteria are always present and these produce fermentation. An overgrowth of other bacteria often interferes with the action of those forms producing the fermentation, and in this way he believes changes in the bacteria cause great irregularity in the results.

GENERAL CONSIDERATIONS CONCERNING INTESTINAL DISEASE.

L. Hofbauer³ discusses the question as to **whether fat can be absorbed without being saponified**. Pflüger considers that as a general rule, at any rate, fat passes the intestinal wall in watery solution. To test this question, Hofbauer administered fat colored with dyes such as Sudan III and Alcanna-red, which are insoluble in water, and which, therefore, if the fat went into solution, would be deposited; while if the fat were absorbed undissolved or in emulsion, the dyes pass the intestinal wall with the fat. His observation showed the fat in the chyle vessels still stained, and there was no appearance of precipitated dye in the intestinal canal, and in a case of chyluria the urine was found stained red after giving Sudan III, an evidence that in this case the fat had passed the intestinal wall in emulsion. Pflüger⁴ replies to this article that there are present in the intestines bile, glycerin, and various other substances which might readily have the power of dissolving the stains used, and that persistence of the stain in the chyle vessels did not by any means show that the fat had not become saponified and gone into solution before passing the intestinal wall.

J. C. Hemmeter⁵ made sterile extracts of human feces, and inves-

¹ Deut. med. Woch., Sept. 6, 1900.

² Deut. Arch. f. klin. Med., Bd. LVIII, H. 5 u. 6.

³ Pflüger's Arch., Bd. LXXXI, S. 262.

⁵ Pflüger's Arch., Bd. LXXXI, S. 151.

⁴ *Ibid.* S. 375.

tigated the **fermentative action** of the same. He found ferments present in normal specimens, while they were less common in cases of diarrhea or constipation. There were marked variations in different cases, even though the subjects were normal. Both protein and carbohydrate digestion were observed in neutral solutions; they were more marked in weakly alkaline solutions, but were not seen in acid solutions. A fat-splitting action was never observed. A proteolytic ferment was found in the feces of a patient with gastric atrophy, whose stomach contained no pepsin and no HCl. The ferment was thought to have come from the intestinal glands and the pancreas.

Schilling¹ discusses the **crystals found in the feces**, and directs especial attention to the fact that these crystals are largely derived from vegetable foods. He considers that they are of much importance in stimulating peristalsis, and also probably in stimulating secretion from the gastric and intestinal glands. He thinks that the influence of vegetable foods upon constipation is perhaps explainable to a considerable extent through the large amounts of these crystals which they contain, the crystals acting as mechanical irritants.

Marcus,² in repeating the experiments of Posner and Lewin on the **passage of bacteria through the intestinal walls**, found, when using the method reported by these authors in 6 experiments, in every instance infection of the urine, but in only 1 instance a general infection. When, however, he caused stagnation of the intestinal contents by his own method, which was to his mind much less severe, he found in 2 instances that there was not any sign of an infection even of the urine. He believes that the difference in results is due to difference in methods, and that the experiments of Posner and Lewin are not sufficient to demonstrate the conditions that exist in human beings with mere coprostasis.

G. Posner and J. Cohn,³ in answer to the objection that their previous work on the passage of the intestinal wall by bacteria was of little value because of injury to the intestine during the experiments, have carried on further experiments by **closing the anus with collodion** in order to avoid injury of the bowel. After injecting the colon bacillus and prodigiosus they found in a number of instances that the organisms could be found in various regions in the body. They think that the infection took place through the blood, as the kidney has been found sterile under such circumstances if the renal artery was previously ligated. They consider that bacteria can undoubtedly pass the intestinal wall, but think that the normal bowel does not allow this. Mechanical disturbances and the action of pathologic bacteria upon the bowel-wall are the conditions which probably influence the passage of the bacteria. The clinical conditions which will probably favor this are fecal impaction, blood stasis, and similar conditions. They consider it probable that some urinary infections may be due to invasion of bacteria from the intestine.

L. Loew⁴ has investigated the question of postmortem invasion of

¹ Münch. med. Woch., 1900, No. 42.

² Wien. klin. Woch., 1901, No. 1.

³ Berlin. klin. Woch., Sept. 3, 1900.

⁴ Zeit. f. Heilk., Bd. XXI, H. 1.

bacteria experimentally by injecting pure cultures of various microorganisms in 112 bodies. He decides that while a pure postmortem invasion of bacteria may take place into organs near by (liver, gall-bladder, urinary bladder, etc.), a **general invasion** into the circulation or into the heart cavities **scarcely ever occurs**. He considers that the bacteria found in bodies postmortem are there as the result of an invasion during life, possibly in the agonal period. The reason that animal investigations point toward postmortem invasion as a much more frequent condition is, he believes, due to the fact that investigations are usually undertaken on small animals, and, as to space traversed, a fairly general invasion in such animals would in man be more local, for in man the organs lie much further apart. Further, the intestinal conditions in animals are not improbably decidedly different from those in man.

CONSTIPATION.

Roos¹ considers that the microorganisms of the intestine, in producing decomposition and fermentation, have a marked influence upon peristalsis. He has therefore undertaken the very remarkable task of **treating constipation** by administering **cultures of colon bacteria** in keratinized capsules, and in a number of instances has observed satisfactory bowel movements, and this often continued for some time after the treatment was stopped. If the bacilli were previously killed, this effect was not observed; it was also produced by lactic acid bacilli or pure lactic acid. The use of yeast, however, caused similar results, even though the yeast was killed by heat before administration.

O. Ziemssen² recommends the use of **gastric lavage** in the treatment of chronic constipation. He uses a tube in the morning before breakfast, washing the stomach with Wiesbaden and Kochbrünnen water, introducing $\frac{1}{2}$ to 1 liter and siphoning it off and repeating this procedure a number of times. The filling and emptying of the stomach are said to act as a stimulant to the muscles of the organ and to influence the peristalsis of the intestine. The same procedure is useful with various forms of chronic gastric disease. Ziemssen has even used lavage in cases of gastric ulcer, and has never seen bad results, but thinks it should be used only by those skilled in the practice.

ENTERITIS.

Fermentative Intestinal Dyspepsia.—Schmidt and Strasburger,³ in a sixth communication, discuss the condition which they have termed fermentative intestinal dyspepsia of adults or insufficiency of starchy digestion. This is a condition which according to their studies is characterized most distinctly by **increased fermentation of the fecal matter**. This is determined by their method of estimation of the gases eliminated from a given quantity in a specially constructed glass globe.

¹ Münch. med. Woch., 1900, No. 43.

² Berlin. klin. Woch., Aug. 13, 1900.

³ Deut. Arch. f. klin. Med., Bd. LIX, S. 5 u. 6.

If 5 grams obtained after a definite diet eliminate sufficient gas in 24 hours at oven temperature to displace one-fourth of the glass, they conclude that there is abnormal fermentation. In normal individuals there may be occasionally fermentation of this degree, and in cases of fermentative intestinal dyspepsia there may be occasionally less. Repeated observations are therefore necessary. The cases under discussion for the most part present no distinct clinical symptoms. Some of them come under observation on account of other ailments. The patients were generally of middle age and, in their experience, of the male sex, but the latter is probably due to the fact that their observations were more largely conducted on the male side of the hospital. The disease is evidently chronic. Acute onset was rare. Among the **symptoms**, vague pain in the region of the umbilicus and more frequently tenderness or often pain on pressure were noted. The pressure over the region of the stomach caused no pain. The tongue was often coated, but the breath was rarely fetid. Distention of the abdomen was common, but there was no resistance or induration. Examination of the contents of the stomach in 12 of the 20 cases gave normal results in 8, and in 3 cases subacidity, and in 1 of these motor insufficiency. In the last case the results were not satisfactory. There is rarely actual diarrhea in these cases, though there may be several movements per day. The appearance of the discharges is variable, though a characteristic condition is a fermented, more or less foamy condition. Often there is a strong odor of butyric acid. The chemie examination in several cases was compared with chemie examinations under the same conditions in healthy persons, and in cases midway between the normal and the condition under discussion. They found that with a given diet the total amount of fecal matter was greatly increased, comparing to the normal as 104.4 is to 59.3. The percentage of dry residue is little reduced in this increased quantity, the proportion to the normal being as 19.29 is to 24.04. The total excretion of nitrogen in the normal, as compared with the cases studied, was as 2.98 is to 6.28. The percentage proportion of nitrogen, however, is only a little greater than in health. The amount of fat varies but little, though it is somewhat larger in the cases of intestinal dyspepsia. The greatest differences were found in the quantities of carbohydrates. In health the total quantity was about 1.91; in the patients studied it was increased to 4.87, and in the transitional cases it was 5.85. Taking the percentage relations in the dried fecal matter, they found 3.22% in the normal, 5.18% in the transitional, and 6.43% in the dyspeptic cases. In discussing the nature of this disturbance they are careful to insist that they do not regard this as a definite disease, but rather as a symptom-complex due to uncertain pathologic conditions. While they suspect catarrhal intestinal trouble on account of the occasionally positive association of catarrhal gastritis, they admit the possibility of nervous influences operating in some cases. It has been stated by some reviewers that the condition is not necessarily pathologic, but may be a variation from usual conditions, but not sufficient to constitute an abnormal state. To this they object that there is evi-

dently a decided variation from the normal, and one great enough to constitute a pathologic state. The trouble seems localized in the small intestine. The stomach may be associated, but the large intestine is only secondarily involved. With regard to microorganisms operating to produce the fermentation, they consider mainly the coli bacilli and the small intestinal diplococci. In 2 cases they found a leptothrix which may have been of importance etiologically.

W. J. Buchanan¹ discusses the **hot-weather diarrhea of India**. The disease has a sudden onset; the patient is overtaken with vomiting and purging, this consisting at first of food-remnants and feces; the bowel movements rapidly become more abundant and watery and freer from food-remnants. Collapse comes on, the patient becomes somewhat cyanotic, and the general appearance is to some degree similar to that of cholera. There may be a somewhat rapid suppression of urine. The symptoms become less severe, within 24 hours collapse gives place to fever, and subsequently the course is a rapid one toward recovery, though dysenteric symptoms may appear. Some albuminuria during the attack is frequent. The disease may be confounded with cholera, but is differentiated by the absence of abdominal cramps, less pronounced collapse, and the absence of rice-water stools. The treatment should consist chiefly of stimulation, and, if the bowels have been freely purged, the use of chlorodyne. It is caused by eating improper food, by alcoholism, and by excessive water drinking.

Treatment.—A. Lasker² reports his clinical results from the use of **salacetol**. He recommends it strongly as an intestinal disinfectant, as a disinfectant for the bladder, and in rheumatism and rheumatoid conditions. It contains somewhat less salicylic acid than sodium salicylate, but is said to have quite as useful an effect, and the toxic effect is much less marked. He begins with as much as 90 grains per day.

Schaefer³ considers **ichthoform** an extremely valuable drug in the treatment of various forms of intestinal affections, and reports strikingly good results from its use in tuberculous disease of the bowel, whether this be primary or secondary. He states that it relieves the pain and the diarrhea, and, he believes, prevents the infection of other tissues. He advises its use in doses of from 7 to 12 grains 3 times a day in children, and has given it in doses as large as 150 grains a day in adults.

Kolipinski⁴ considers subcutaneous injections of small doses of the **arsenate of soda** in 0.5% salt solution extremely valuable in chronic enteritis, even when of the tuberculous variety. The injections are said to be painless. They should be used from 1 to 3 times a week.

L. Kolipinski⁵ reports a series of cases of chronic enteritis and tubercular enteritis treated with marked improvement by **hypodermic injections of arsenic**.

¹ Brit. Med. Jour., Sept. 1, 1900.

² Deut. Aerzte-Zeitung, 1900, H. 12.

³ Therap. der Gegenwart, Oct., 1900.

⁴ Med. News, Aug. 11, 1900.

⁵ Med. News, Aug. 11, 1900.

APPENDICITIS.

O. Schaumann¹ believes that there is direct **relation between general neuroses and appendicitis**. He first refers to the fact that in 5 cases of severe neurasthenia he observed the onset of appendicitis, all of these cases being seen within 2 years. He then notes that appendicitis is often associated with mucomembranous enterocolitis and that the latter is a neurosis. Also, neurasthenia is very commonly associated with alterations in the position of the abdominal organs, and he believes that the appendix in these cases frequently has an abnormal position, and alterations in the position of the appendix would readily give opportunity for appendicitis. In cases of appendicitis the appendix is frequently found in abnormal position. Some authors have even gone so far as to state that appendicitis is very commonly the result, or is at least a common accompaniment of movable right kidney. He would by no means indicate that appendicitis is always a nervous stigma, but he insists that it is frequently of an indirect nervous origin.

Kratz² describes a case in which at autopsy he discovered a **phlegmon of the appendix** which he is inclined to attribute to coincident tonsillitis. He believes that in cases of tonsillitis a large number of virulent bacteria are swallowed, and thinks that many of them lodge in the intestine, and if conditions favorable for the production of appendicitis are present, this is likely to occur.

Dieulafoy³ reports 6 cases of **hematemesis occurring during the course of appendicitis**. Two hundred, 300, and even up to 800 grams of blood, either liquid or in dark, blackish clots, may be vomited. Death usually terminates these cases, which are operated upon too late to prevent a general infection, which is the cause of the bleeding from the stomach.

H. A. Hare⁴ discusses those cases in which acute **appendicitis is apparently present**, but in which the symptoms subside somewhat and are followed by the **usual course of typhoid fever**, and other cases in which in the course of typhoid fever symptoms of appendicitis develop. He describes cases illustrating these conditions and demonstrating the difficulty in diagnosis. Hare thinks that these cases are due either to a coincidence of ordinary appendicitis and typhoid fever, or to typhoid fever with marked intestinal symptoms simulating appendicitis. In the diagnosis he recommends investigation of the number of leukocytes, a leukopenia existing in typhoid fever, a leukocytosis being present in appendicitis.

Treatment.—A. L. Benedict,⁵ in discussing appendicitis from a **medical standpoint**, protests against advising operation in every case in which a diagnosis of appendicitis is made, and lays down the following rules: If the temperature is high in the beginning, or continues above

¹ Deut. med. Woch., Nov. 1, 1900.

² Wien. klin. Woch., 1900, No. 49.

³ Gaz. Hebdom. de Méd. et de Chir., Feb. 17, 1901.

⁴ Med. News, July 21, 1900.

⁵ Med. News, Dec. 1, 1900.

100° beyond the second day, operation is indicated ; rapidity and feebleness of the pulse with low temperature suggest gangrene or sepsis, and a leukocytosis of more than 20,000 indicates operation. When medicinal treatment is carried out, he advises withholding food at first, moderate purgation, the use of intestinal antiseptics, and subsequently extremely careful dieting continued over several months.

C. Rosenwater,¹ in discussing the medicinal treatment of appendicitis, states that all patients should not be submitted to surgical operation. If the operation is decided against, he recommends calomel followed by a saline, and large injections of salt solution into the colon unless there is any danger of rupture of an abscess. He insists that a **non-irritating diet** should be used for months after the attack. He believes that matting of the bowels may be avoided to a considerable extent by using large drafts of hot water and small doses of ammonium iodid.

DYSENTERY.

S. Flexner² presents an interesting paper on the **etiology of tropical dysentery**. He gives a careful review of the work that has been done on the bacteria and protozoa suspected of causing the disease, stating that no bacterial species previously described has any especial claim to be considered the chief microorganism concerned in the causation of the disease. He considers it unlikely that any bacterial species constantly and normally present in the intestine or in the environs of man, unless the disease prevails in endemic form, can be regarded as the cause of dysentery. He considers it **improbable that sporadic and epidemic dysentery are produced by the same cause**. Amebas are commonly present in subacute and chronic dysentery, and the pathologic action of *Amoebic coli* has not been disproved. They have, however, not been shown to be actively connected with the causation of acute dysenteries, even in the tropics. He believes that the bacterial association in subacute and chronic dysentery has much influence upon the pathologic powers of the amebas. He discusses the dysentery of Japan which has prevailed since 1878, the total number of cases known being over 1,000,000, and the deaths over 275,000. Flexner has made a study of the dysentery seen in Manila, largely among soldiers. He found this to be the most frequent disease in the soldiers of the American army. It was seen in two forms—acute and chronic. Amebas were absent in the acute forms, but they were commonly present in the chronic forms, though their occurrence and numbers were variable. Large single abscesses of the liver were often seen, but amebas were not always found in their contents. The pathologic lesions found were widely different from those of amoebic dysentery in acute cases, and agreed only in part in the chronic cases. The description of the gross lesions is chiefly thickening of the walls of the bowel, swelling of the mucous membrane, and increase of its consistence, small hemorrhages, the absence of distinct false membrane, the presence of white elevations

¹ Med. Rec., Aug. 4, 1900.

² Phila. Med. Jour., Sept. 1, 1900.

which after washing proved to be minute losses of tissue leading into the submucosa, the whole mucous membrane thus presenting a sieve-like appearance. Histologically the changes were most marked in the mucous membrane under the mucosa and consisted of coagulation-necrosis of the mucous membrane with hemorrhages, and cellular accumulations in the submucosa, the cellular masses consisting chiefly of plasma-cells. The submucosa was at times affected without change in the mucosa. The lesions of the submucosa were considered to be toxic; bacteria were absent in this layer of the bowel. In his bacteriologic studies Flexner found two bacilli, one of them a form of bacillus present in all instances, whose properties agreed with those of the colon group. **The blood of the host frequently reacted** with this bacillus in low dilutions; with the blood of other individuals the bacillus reacted only rarely. The other bacillus corresponded entirely to that described by Shiga as present in the Japanese dysentery. It was about the size of the colon bacillus, varying somewhat in length. The individual bacilli were usually separate, the ends slightly rounded, and the bacillus showed marked motility. It did not stain by Gram; it grew well on all culture media; it did not liquefy gelatin. Its colonies resembled those of *Bacillus typhosus*; it clouded bouillon, produced no pedicle, litmus milk ultimately became deep blue; it formed no indol; it was agglutinated in many cases by the blood-serum of the host or of other persons suffering from dysentery. A serum prepared by Shiga from this bacillus was used in a series of cases, and in these the mortality varied from 9% to 12%, while in the same period cases not treated with serum gave a mortality of from 28.5% to 37.9%. Flexner thinks that the type of chronic dysentery caused by this bacillus is less frequent than that which is apparently associated with the amebas, but its extent may perhaps be successfully studied with the serum reaction. **He doubts whether there is any general specific organism of dysentery.** Excluding the sporadic cases, however, which have not been sufficiently studied, it is quite possible that two specific organisms may be responsible for the epidemic and endemic diseases. Tropical dysentery consists, he thinks, of bacillary and amebic forms, which have distinct clinical histories, etiology, and pathologic anatomy. This conclusion, however, he considers to be not yet fully justified.

J. H. Musser¹ describes a case of tropical dysentery occurring in a soldier of 32, who had been in Porto Rico. The most interesting point in the case was that a **positive serum test** was obtained with cultures of the bacillus of Shiga. The test was of marked value in this case, because the man presented the clinical appearance of pronounced scurvy during the course of the disease. He emaciated to an extreme degree, and finally died in the so-called typhoid state. The autopsy showed dysenteric lesions of the colon, with profuse anemia. An organism was found corresponding with that discovered by Flexner in Manila.

W. Kruse² has investigated a large series of cases of dysentery which occurred in a local epidemic in which there were about 300 cases

¹ Jour. Am. Med. Assoc., Jan. 5, 1901.

² Dent. med. Woch., Oct. 4, 1900.

with 30 deaths, and has found almost constantly, and usually in pure culture, a **small plump bacillus** which in most characteristics was practically the same as the bacillus described by Shiga and Flexner, but which differed in the fact that it was not motile, and that the superficial colonies were very different from the deep colonies. The bacillus **agglutinated readily with the blood-serum** of those who had been ill with the disease for at least 7 days, agglutination always occurring in a dilution as great as 1 : 50, and sometimes in a dilution even up to 1 : 1000. In healthy persons agglutination was never found in dilutions greater than 1 : 20, except in very rare cases. Other intestinal bacteria did not produce agglutination. The gross changes in the intestine differed from those in Japanese dysentery in that there was practically always a widespread pseudomembrane formation in the colon.

Deycke,¹ in referring to Kruse's paper, states briefly that in working in Constantinople on the etiology of dysentery he was able to get cultures from the stools of dysentery cases of a **bacillus which belonged to the colon group**, and was closely similar to the typhoid bacillus. It was present constantly in far larger numbers than any other organism. Pure cultures were easily obtained, and the **pathogenicity of the organism was shown** by the almost constant production of a typical bloody and purulent diarrhea with marked wasting, when administered to cats in their food; postmortem examination of the cats showed hemorrhages, erosions, and ulcerations of the mucous membrane of the large intestine. Microscopically the conditions found were analogous to those seen in human beings. A more extended report will appear later.

J. J. Day,² in discussing the occurrence of **dysentery in South Africa**, insists that a great many cases have been given this name when they are merely ordinary diarrhea accompanied by some pain, and perhaps by the passage of a small amount of blood and mucus. Actual severe acute dysentery was comparatively rare. Day has most successful results from treating both acute diarrhea and dysentery by a preliminary dose of castor oil and opium followed by a strict diet and the use of a dram of magnesium sulphate with dilute sulphuric acid until the stools become feculent. With relief of the tenesmus and disappearance of the blood and mucus from the stools the frequency of dosage with magnesium was decreased, but it was always given for as long as 48 hours. The disease is very likely to recur if the patient is soon exposed to the sun. He insists that cases of dysentery should be kept entirely separate from typhoid fever, and that the stools from dysenteric patients should be as carefully disinfected as typhoidal stools. He noted in several instances complications by scurvy, malaria, and synovitis.

Berthier³ considers **methylen-blue** the best drug for dysentery. He says it is a parasiticide, an analgesic, and a cholagog. It should be given in warm injections, from 1 to 2 decigrams of blue to $\frac{1}{2}$ to 1 liter of water, and about 4 injections daily, depending upon the irritability of the intestines.

¹ Dent. med. Woch., Jan. 3, 1901.

² Brit. Med. Jour., Jan. 26, 1901.

³ Med. News, Nov. 17, 1900, from La Méd. Moderne, Oct. 10, 1900.

MEMBRANOUS ENTERITIS.

Mannaberg¹ contributes a review of the opinions concerning the **pathogenesis and the pathologic anatomy of membranous enteritis**, from which he draws conclusions. The diversity of opinion in regard to the frequency of the disease, and the great number of cases, which have in common alone the passing of more or less mucus, which have been reported under the name of colitis membranacea and its synonyms, show the lack of a generally accepted pathology, and the insufficient consideration of the clinical picture presented. Some investigators consider it an organic disease of the intestine, principally of the large bowel; others class it as a secretory and motor neurosis of the intestines, while a third group concludes that there are two entirely different conditions, one an inflammatory disease of the intestinal mucous membrane, with the production of an extraordinary amount of mucus, and the other a purely nervous disease without any organic change in the bowel. A few authors think that there may be a combination of both the above types. The cases reported by these three divisions of investigators are carefully reviewed, and the clinical and pathologic findings lead the author to the following conclusions: **"Two different pathologic entities have been confused under the name colitis membranacea and its synonyms.** One group is characterized by signs and symptoms which indicate an inflammatory process in the mucous membrane of the large gut, while the other shows no such change, but gives evidence of a functional disturbance, the principal factors of which are spasm of the muscularis of the large intestine and hypersecretion of the mucous glands." He agrees with Nothnagel, therefore, to differentiate colica mucosa from enteritis membranacea, and "to consider the former a disease *sui generis*, and the latter a form of enteritis, marked by profuse mucoid and membranous stools, and caused by chronic diarrhea, tropical dysentery, typhoid fever, hemorrhoids, intestinal tumors, irritating enemas (especially of silver nitrate, vinegar, alum, tannin, and glycerin), anthelmintics, and drastics." Colica mucosa is not connected with any of the above causes, but is apt to occur in nervous cultivated people who are usually constipated, and suffer from some lesion of the genitalia, enteroptosis, and achylia gastrica. The cause of enteritis membranacea is easily discovered, while that of colica mucosa may be sought for in vain. Constipation and enteroptosis have been thought to be of causal influence. The author thinks there may be an indirect connection between constipation and colica mucosa, brought about by the fact that "mucus is amassed in an empty, contracted, and for a considerable time inactive part of the large bowel, and may be formed into cords and cylinders in the folds of the bowel, to be expelled later by more or less severe colicky contractions." The achylia gastrica is probably an expression of the disturbance of the nervous function of the bowel. A greater number of carefully carried out pathologic examinations and investigation of the innervation of the mucous glands of the

¹ Wien. med. Woch., Oct. 20, 1900.

intestine are needed to make us able to differentiate more exactly between colica mucosa and enteritis membranacea, a diagnosis which is not only of scientific interest, but upon which depends the entire treatment.

I. Boas¹ discusses the **symptomatology and diagnosis** of membranous colitis and of mucous colic. Membranous colitis he describes as a catarrhal affection of the colon which is accompanied by the formation of mucous casts and always associated with some actual disease. Mucous colic he characterizes as an affection in which there are attacks of colic with the passage of mucous casts, but with entire absence of signs of local disease. The latter condition is much rarer than the former, and Boas considers that it can be properly diagnosed only when mucus is constantly absent from the stools in the interval between attacks of colic, and when other signs of organic disease are entirely absent. He states that he has repeatedly known the signs of membranous colitis to be produced after the application of local astringents; that is, persons with ordinary colitis, after the local use of astringents, have colicky attacks and pass casts. Boas thinks that the cast-formation in these cases is produced by the astringent and does not occur spontaneously. He thinks that even simple enemas may at times produce this result. In the symptomatology of these affections he states that obstipation is always present in mucous colic, and usually in the other affection. Membranous colitis may exist without colic, and in mucous colic it is essential to remember that status neurosis is not a constant characteristic of the disease, and also that status neurosis may be present in cases of colitis with or without the formation of casts. Disturbance of nutrition is, however, always present in mucous colic, both as a cause of the disease and as a result. In diagnosis it is of importance to determine whether the affection is primary or is secondary to some primary trouble of other forms, such as appendicitis or carcinoma. The cases are much easier to recognize if casts are passed, but casts should be looked for in suspected cases even if they are not known to have been passed. In the latter instances high washings of the colon will often produce casts. One should always remember that membranous colitis is **frequently not a disease, but a symptom** of appendicitis, carcinoma, or disease of the female internal genitalia. In order to avoid overlooking important organic disease membranous colic in particular should be diagnosed only when there is a complete absence of the signs of organic disease in the intervals between the attacks of colic.

INTESTINAL CALCULUS.

Langenhagen and Schmitt² report cases of intestinal calculi formed of a cement of **lime and magnesia**, which had been administered in cachets. When bicarbonate of soda, magnesia, and bismuth are given in cases of hyperchlorhydria, the acidity of the gastric juice is neutral-

¹ Deut. med. Woch., Aug. 16, 1900.

² Gaz. Hebdom. de Méd. et de Chir., Feb. 7, 1901.

ized by the soda, and the other substances remain unchanged and become compact, hard masses. The addition of sugars to lime and magnesia forms a soluble compound, and may thus prevent the production of these calculi.

INTESTINAL OBSTRUCTION.

H. Schloffer¹ discusses **traumatic strictures** of the intestine, directing his attention to those strictures which follow nonperforating abdominal injuries. He discusses 10 cases previously reported and a personal case, and also a **series of experiments** which he has carried out for the purpose of determining the manner in which the primary lesion is produced. He decides that traumatic strictures may occur as the result of a beginning invagination followed by a loss of rigidity of the intestinal wall, and a degeneration of the muscles as a result of trauma. Circular strictures may also occur as a result of trauma, acting directly upon the affected region of the intestine. Compression of the intestine is likely to lead to this result even if the damage is not severe; but it is most likely to follow when there are severe lesions of the submucosa. Circular strictures may also occur as the **result of damage of the mesentery**, the intestinal difficulty following as a result of circulatory disturbance and consequent necrosis, the necrosis involving either the inner layers of the wall or the entire wall. Incomplete ruptures of the layers of the wall may in rare instances heal as a result of fortunate adhesions, and then subsequently produce a stricture. It is probable that true invaginations may ultimately result in stricture after undergoing temporary cure; also, localized damage of the wall of the intestine from pressure may lead to the production of stenosis. All the cases of traumatic stricture of the intestine so far reported have occurred in men or boys as a result of severe blows on the abdomen, or the falling of heavy weights upon the abdomen, particularly in the region of the umbilicus, where the result is severe compression of the intestine against the spinal column. The stricture, in all the cases reported, was situated in the small intestine. The symptoms as a rule appear shortly after the injury; in 4 cases, however, the appearance of the symptoms was prolonged to from $2\frac{1}{2}$ to 8 months; so long a period as the latter occurred in only 1 case. The prognosis is bad unless operation is undertaken. In 5 cases not operated upon a fatal issue ensued, while in 5 other cases a cure followed operation.

L. Atixier and E. Viannay² describe a case of intestinal obstruction in which **severe hematemesis occurred**. They note that this symptom is scarcely mentioned in treatises as being an accompaniment of stenosis of the intestine, but it has been recorded as complicating this affection, and it is not surprising that it does occasionally occur because stenosis causes extreme congestion of the intestine. It also causes great

¹ Mittheil. aus den Grenzgeb. der Med. und Chir., Bd. VII, H. 1.

² Gaz. Hebdom. de Méd. et de Chir., 1900, No. 76.

vasomotor disturbance and inflammatory changes, and, further, the toxic material contained in the intestine may readily cause profound alterations in the vessel walls, and of the blood in the neighborhood of the occlusion. In repeated instances there have been no local lesions found in these cases which were such as to give a clue as to the actual source of the hemorrhage. The occurrence of hemorrhage **makes the prognosis decidedly bad**, as it indicates severe results of the occlusion. In the case reported the patient was admitted with evident signs of stenosis, and laparotomy disclosed adhesions which were so far as possible loosened. The operation resulted in improvement, but after a few hours the patient began to vomit severely, and the vomit was of a black color without fecal odor, and gave characteristic reactions of blood. As much as 2 liters of this black material was vomited within 24 hours, and a considerable amount was found at autopsy in the upper portion of the intestine. The stenosis was due to adhesions about 50 centimeters from the ileocecal valve. The intestine showed profound congestion, and hemorrhagic suffusion at the point of stricture, but no definite local source of hemorrhage.

Treatment.—Marcinowski ¹ describes 2 cases of intestinal obstruction, one apparently the result of lifting a heavy weight, the other apparently being due to incarcerated hernia, in which, after unsuccessful use of other methods, he injected about $\frac{1}{14}$ grain of **atropin hypodermically**, the symptoms being rapidly relieved in both cases, and both patients regaining good health.

Holz ² describes the case of a man of 42 who had symptoms of complete obstruction of the bowel. He was treated with opium and enemata, the result being wholly unsatisfactory. After injecting $\frac{1}{60}$ grain of **atropia**, expulsion of flatus occurred, the bowels afterward moved normally, and the patient recovered.

C. Demme ³ also reports 2 cases of intestinal obstruction treated by the injection of about $\frac{1}{14}$ grain of **atropin into the abdominal wall**, the result being free bowel movements and recovery.

Luttgen ⁴ likewise describes an instance of obstruction of the bowel in an old woman, apparently due to femoral hernia. Operation was undertaken and the hernia was found to be in good condition. The next day $\frac{1}{14}$ grain of **atropin** was injected into the abdominal wall, and some hours later a bowel movement followed, and the patient recovered. She showed, however, distinct symptoms of atropin-poisoning.

Ostermaier ⁵ describes a case of intestinal obstruction in which there had been complete constipation for 10 days, and in which profound collapse had ensued. Several doses of a similar amount of atropin were given this patient, and complete recovery occurred in this case also. Ostermaier also used atropin successfully in a case of biliary colic due to gall-stones. The symptoms were satisfactorily relieved.

¹ Münch. med. Woch., Oct. 23, 1900.

² Münch. med. Woch., Nov. 22, 1900.

³ Münch. med. Woch., Nov. 22, 1900.

⁴ Münch. med. Woch., Nov. 22, 1900.

⁵ Münch. med. Woch., Dec. 4, 1900.

CARCINOMA OF THE INTESTINE.

H. D. Rolleston¹ describes a case in which, after the fourth attack of what seemed clinically to be appendicitis, removal of the appendix was undertaken and the organ was found to contain a small nodule which seemed to be tuberculous. The patient, however, subsequently developed severe cachexia with the signs of secondary carcinoma, and microscopic examination of the nodule in the appendix then proved that it was carcinoma, the growth being most extensive in the mucous coating, the peritoneal lining being free. It seemed evident, therefore, that this growth had originated in the mucous membrane, and that it was a case of **primary carcinoma of the appendix**. Usually, in primary carcinoma of the appendix it has been found that the symptoms are those of appendicitis. [Carcinoma of other portions of the bowel, particularly of the cecum, is also likely to be mistaken for appendicitis, and it is essential to have the former possibility always in mind if the patient is in or beyond middle life, and particularly if he has little or no fever, but other signs strongly suggesting appendicitis.]

E. Holländer,² in discussing the **diagnosis of carcinoma of the intestine**, lays especial stress upon the importance of a **family history of carcinoma**. He reports in full 2 very interesting family histories, in one of which there were in the collateral branches of the family, within four generations, 10 certain cases of carcinoma, 4 of them being in the gastrointestinal tract. In the other family history reported there were in three generations 7 instances of carcinoma either of the uterus or intestine. Such a family history he considers of decided importance in diagnosis, particularly in carcinoma of the bowel. The second point which he makes is that skin changes are very common in these cases. He divides them into three varieties—vascular changes, seborrheic warts, and pigmentation. The vascular changes consist chiefly of small capillary hemorrhages and angiomas. The warts may become of very considerable size and be very widespread. The pigmentation varies from small spots to almost complete covering of the body.

SARCOMA OF THE INTESTINE.

B. Land³ reports 3 cases of **sarcoma of the ileocecal region**, directing attention to the great rarity of this form of growth in this region. These tumors are apparently always or nearly always round-cell sarcomas and usually arise from the serous coat. As a result of the latter fact they ordinarily do not cause signs of obstruction of the intestine. In both the cases reported the tumors were round-cell sarcomas. In the first case, that of a man of 33, there had been for a number of years more or less gastric disturbance, and 2 years before he was seen the man had had symptoms of appendicitis. Some weeks later a tumor appeared in the region of the appendix, which enlarged until it filled

¹ Lancet, July 7, 1900.

² Deut. med. Woch., July 26, 1900.

³ Virchow's Arch., Bd. CLXII, H. 3.

the greater part of the abdominal cavity. At one time the patient had a vesicular eruption in which suppuration occurred. The tumor finally became infected with the colon bacillus. Operation was undertaken, and a large amount of necrotic tissue removed. The patient died from exhaustion. The tumor was found to involve the cecum and the lower part of the ascending colon, the bowel having been transformed into a rigid tube. The second case occurred in a woman of 66. She had had symptoms chiefly consisting of pain in the ileocecal region for about 6 months. The tumor was found at autopsy to be situated at the ileocecal valve.

F. Smoler¹ reports a case in which a **melanotic sarcoma** of the intestine was found to be the **cause of intussusception**. The patient was admitted with the signs of occlusion of the intestine. Operation showed an intussusception 10 centimeters long, and in the proximal portion of the intestine there was found a tumor about the size of a hen's egg, which occluded practically the whole lumen of the intestine. One tumor only was found, but questioning disclosed the fact that a year previously a melanosarcoma of the arm had been removed. The patient was free from intestinal symptoms at the time of the report, which was a year after the removal of the intestinal tumor.

LIPOMA OF THE INTESTINE.

Gross² reports a case in which operation showed the presence of a pure lipoma of the transverse colon. The tumor was removed, and entire relief from the symptoms resulted. The patient was a man of 47, who seemed in good health with the exception of attacks of cramp-like pain in the abdomen, with symptoms of **partial intestinal obstruction**. The tumor could be felt before the operation.

SYPHILIS OF THE INTESTINE.

Lereboullet³ reported to the Academy of Medicine of Paris a case of chronic diarrhea which occurred in a man of 38, who was of neurasthenic type and whose general health had been much reduced. The diarrhea had been present for 1½ years, and there had been repeated intestinal hemorrhage. Treatment was ineffectual. Multiple enlargement of the glands, however, was observed, and since syphilis was suspected from this, injections of gray oil were given together with doses of potassium iodid by the mouth. The diarrhea and pain disappeared within about 2 weeks, and the patient ultimately recovered entirely. The diagnosis was **diarrhea resulting from tertiary syphilis**.

H. G. Marxmiller⁴ reports a case of **dilation of the colon** in a man of 52. There were evidences of spinal syphilis, and he considers the dilation of the colon to have been due to the spinal lesion.

¹ Zeit. f. Heilk., Bd. XXI, H. 9.

³ La Semaine Méd., July 4, 1900.

² Wien. klin. Woch., 1900, No. 46.

⁴ N. Y. Med. Jour., Oct. 13, 1900.

DISEASES OF THE PERITONEUM.

Taylor¹ describes a case of **combined ascites and pleural effusion of obscure causation**, and discusses combined effusions into several serous cavities. The names **polyserositis** and **polyorromenitis** have been given to the condition; Taylor prefers the latter name. The condition is by no means a disease *sui generis*, but may be due to tuberculosis, and might occur in a number of acute diseases. It is commonly due to the tubercle bacillus, to rheumatism, or to infection with the pneumococcus, the streptococcus, or the staphylococcus. It is most common in males, and usually occurs between the fifteenth and the thirtieth year of life. It most frequently involves the peritoneum first, and is then likely to involve the pleura. Sometimes there is a reverse course of the disease, and in rarer instances there is combined pericarditis and pleurisy. The condition in the great majority of cases is tuberculous, and by some writers is thought to be practically always of that nature. The prognosis depends upon the cause; the treatment should usually be that of tuberculous lesions of the serous membranes. In the case reported laparotomy was finally undertaken, and the condition proved to be tuberculous. The patient was not specially benefited by the operation.

Lennander and Scheel² report 4 cases of **simple nontubercular peritonitis with effusion**. In 2 of these instances there was nephritis. In 3 cases laparotomy was undertaken with good results; the fourth died with cardiac trouble. The authors consider that the peritonitis in these cases was primary and not the result of the cardiac or renal trouble, a statement which is somewhat difficult to prove and which seems improbable. They recommend laparotomy in such cases.

J. W. Kales³ reports the case of a man of 34 who had swelling of the left side of the scrotum and of neighboring parts, followed by swelling of the left leg and abdomen, and then of the right leg. A diagnosis was not made at first, and treatment was ineffectual. One month before death the man was tapped, and the fluid was found to have the appearance of rich milk. **Chylous ascites** had not been suspected previously. The man had never been outside of the United States excepting for a year in the Klondike. No autopsy could be made, and no examination of the fluid is recorded.

H. Löhlein,⁴ in discussing the **diagnosis of tubercular peritonitis**, states that while irregular cases of this disease are relatively uncommon in medical clinics, he has found them comparatively common in surgical clinics. Two points of distinction from an ordinary ovarian cyst, which he considers of marked importance, are the observation of the temperature for several days and examination under ether. He has also found that there is usually dullness upon percussion, and resistance upon palpation in the left hypogastrium, while the contrary is the case on the right side. He attributes this to involvement of the mesentery and its retraction, and consequent dragging of the bowel over to the right side. He de-

¹ Brit. Med. Jour., Dec. 15, 1900.

³ Med. Rec., Nov. 17, 1900.

² Nord. med. Arch., 1900, No. 28.

⁴ Deut. med. Woch., Sept. 27, 1900.

scribes a curious case in which a diagnosis of tubercular ascites combined with ovarian cyst was made. A tubercular peritonitis was found, but that which was considered to be an ovarian cyst was found to be a distended bladder adherent to the abdominal wall. Examination of Douglas's pouch through the rectum he considers of the greatest importance in diagnosis. He finds that it is easy in a large percentage of cases to discover either large tubercular nodules or small tubercles by palpation in this way. He also thinks that palpation after this manner is a good method of following the process of the case after operation. He also recommends incision of the posterior vaginal vault for diagnostic purposes.

Treatment.—Meyer¹ recommends the treatment of peritonitis of tubercular or other chronic form by the use of **external applications of alcohol**. He believes that this acts through irritation of the skin and subcutaneous nerves, resulting in a more active circulation in the abdomen and a pronounced local leukocytosis. A case which he specially reports was one of tubercular peritonitis in which spontaneous rupture through the abdominal wall occurred; the intraperitoneal cavity was emptied in this way, the patient recovering entire health.

I. B. Yeo,² in discussing the treatment of tuberculous peritonitis, describes 4 cases which were treated by **ointment containing iodin or iodoform** freely applied to the surface of the abdomen. He also used iodoform and creosote internally. The patients all recovered.

DISEASES OF THE LIVER.

Albu,³ in discussing the **physiology and pathology of bile secretion**, reports his results from his prolonged examination of a case of biliary fistula that had existed for 9 years, and was probably the result of cholelithiasis. Of articles of diet, he believes that fats increase the flow of bile. In discussing cholagoges, he states that no actual cholagog action could be observed from the use of any drug. Calomel and the use of Carlsbad water seemed to increase the flow by increasing the intestinal peristalsis and contracting the bile-passages, but there was no increase in the amount of bile produced. Albu thinks that there is no reason for believing that there is such a thing as a cholagog drug. He found that an absence of bile from the intestine did not hinder the splitting of the fats nor the fat absorption. The absorption of the proteins was likewise not influenced to any notable degree. He further believes that there was **no evidence of any antiseptic action of the bile** in this case; in another of complete closure of the common duct, the feces showed no especially offensive odor, and he states that bile itself, if allowed to stand, will quickly become putrid. Further, he believes that evidence that there was no excess of decomposition was found in the fact that the ethereal sulphates in this case were not increased.

¹ Therap. Monatshefte, Jan., 1901.

² Lancet, Mar. 16, 1901.

³ Berlin. klin. Woch., Sept. 25, 1900.

S. Talma¹ has made a study of the **influence of bile** upon the colon bacillus, typhoid bacillus, and the diphtheria bacillus. In general there was a **distinct restriction of the growth of these organisms**. Different varieties of the bacilli showed decidedly varied sensitiveness to the effects of the bile, the organisms not always showing a power of growth in the bile-passages which was proportionate to their virulence; the growth was much more likely to be proportional to the number introduced. The bactericidal influence of the bile on different organisms varied greatly, and differed in different animals. Talma insists upon the importance of a latent infection following catarrhal jaundice or infectious angiocolitis in the production of cholelithiasis and hypertrophic or atrophic cirrhosis of the liver.

Brauer² is stated in a society report to have discussed the pathologic changes in the bile, particularly investigating the **presence of sugar**. Sugar was not found in normal bile nor in the bile in cases of alimentary glycosuria which showed as much as 4% of sugar in the urine. It was found, however, in diabetes mellitus after Claude Bernard's piqûre, and in cases of pancreatic disease or extirpation of the pancreas. He also found parenchymatous liver-cells in the bile in most cases of disease of the liver; alcohol directly damaged the liver-cells and resulted in their appearance in the bile.

G. Rosenfeld³ contributes a report of some experimental work concerning the **influence of alcohol upon the liver**. After reviewing the previous work upon this question he states that he gave dogs which had been starved for 6 or 7 days 3.5 to 4 cc. of 90% alcohol once or twice daily in large amounts of water through a stomach-tube. The animals became decidedly drunk, and were throughout the greater portion of the experiment much prostrated. The poisoning was continued as long as possible, and the animals were killed before spontaneous death. The livers were removed, and the glycogen and fat were estimated. The most important results were that doses of from 3.5 to 4 cc. of alcohol per kilo of body weight, when given more than four times, resulted in an accumulation in the liver of more than 22% of fat; the amount in an unpoisoned animal after 5 to 7 days of abstinence was about 10%. The livers of these animals were extremely poor in glycogen, an evidence that alcohol has a poisoning effect not only upon the albuminous portions of the cells, but also upon the carbohydrate-retaining function of the cells. The use of cane-sugar decreased the amount of fat accumulating in the liver; and also the animals that were given sugar with the alcohol showed less marked drunkenness. This is analogous to the fact that men who take alcohol with food seem to bear it better than those who take it on an empty stomach. This apparent fact cannot be trusted too far, however, as the animals that received sugar with their alcohol died sooner than those that had received alcohol alone. The effects of alcohol upon animals are not without practical interest in relation to the amount of alcohol taken by

¹ Nederl. Tijdsch. voor Geneeskunde, 1900, No. 2, p. 1053.

² Berlin. klin. Woch., Sept. 24, 1900. ³ Centralbl. f. innere Med., Oct. 20, 1900.

man. The heaviest liquors are frequently taken in amounts which are equivalent to as much as 4 cc. of 96 % alcohol per kilo of body weight, and even 2 liters of light beer a day would be equivalent to 1 cc. of alcohol per kilo of body weight. It was observed that the animals which were given a few large doses of alcohol recovered if the alcohol were stopped, while **smaller doses given constantly caused poisoning**; this is analogous again to the fact that men can stand alcohol better in occasional large excess than when taken constantly in less excessive amounts. Rosenfeld, however, insists that one can use the results obtained in animals to explain all the facts observed in man.

Icterus.—Browicz ¹ considers that icterus is due to an **increased function of normal liver-cells** produced by various forms of irritants. The liver-cells thereby break down excessive quantities of hemoglobin and produce an excess of bile. Only normal liver-cells are able to excrete this large amount of bile completely into the intercellular bile-passages; hence when an excess of bile is produced, and the liver-cells are partially diseased, the bile escapes through the blood-capillaries into the circulation. Mechanical conditions, he believes, have only a secondary influence upon the production of icterus. They act through producing disturbance in the circulation in the blood-capillaries. He believes that the bile is absorbed into the general circulation almost entirely through the blood-capillaries, and that this takes place to but slight extent through the lymph-channels. All forms of icterus, he considers, are explained through this theory of an overproduction of bile. [The theories offered do not agree with experimental and clinical observations.]

Queirolo and Benvenuti ² made an experimental study of the **pathogenesis of icterus**, discussing the question whether obstructive jaundice is produced by absorption of the bile into the blood-vessels or into the lymph-channels. The latter is the view more commonly accepted. Were this the case, it is considered by many authors that the bile must pass into the thoracic duct. The authors made animal experiments, chiefly consisting of tying the bile-duct and at the same time tying the thoracic duct. Icterus occurred in spite of the latter procedure, hence the obstruction of the thoracic duct had no influence upon the jaundice, and they decide that the bile is absorbed chiefly by the intrahepatic veins, and that the lymph-channels play only an unimportant role in the absorption of bile. [The experiment demonstrates only that bile may be absorbed into the blood-vessels, not that it is so absorbed under the usual conditions under which icterus occurs.]

A. Gilbert and P. Lereboullet ³ discuss a condition which they term **simple acholuric icterus**. They describe it as characterized by the occurrence of more or less marked yellowish discoloration of the skin, noticeable in certain areas or over the whole surface, with **absence of bile pigment in the urine**, but constantly accompanied by the presence of such pigments in the blood-serum. They consider that

¹ Wien. klin. Woch., 1900, No. 35.

² Il Policlinico, 1900, No. 13.

³ Gaz. Hebdom. de Méd. et de Chir., 1900, No. 90.

there is a marked family tendency to the affection, and that the histories of the cases showed distinct heredity. It is closely related to various forms of chronic infection of the bile-passages, but they apply the name only to those cases in which there is a pure acholuric icterus, and not to those in which acholuric icterus occurs as a result of or accompanying the more common variety of icterus with evident chronic affection of the bile-passages. Jews are especially subject to the affection. The condition commonly develops very slowly, and the time of its origin is usually uncertain; but it as a rule begins in early childhood or near birth. The chief symptoms are a yellow color of the skin, of variable intensity, the presence of bile pigment in the serum in varying amounts, with absence of these pigments in the urine, and the absence of any marked objective signs relating to the liver or spleen. The disease is often entirely latent in its course, but it not infrequently produces urticaria and xanthelasma, and dyspeptic disturbances are quite common. Nervous symptoms also may appear and are not infrequent, and there may be a hemorrhagic or a rheumatoid tendency. The disease is apparently due to a mild chronic infection of the bile-passages in persons who have a hereditary predisposition to hepatic disease. The prognosis is remarkably good in spite of the prolonged course of the disease, unless extremely sensitive persons are affected.

Acute Hepatitis.—P. Remlinger,¹ in discussing **acute hepatitis following dysentery**, reports 4 cases in which the symptoms closely resembled abscess of the liver. In the first case, after having been in the tropics, the patient, who was a soldier, had protracted diarrhea, and after about a year and a half developed symptoms of hepatic abscess, but puncture did not disclose any pus. Several drams of blood escaped from the point of puncture, however, and after this time the man's condition improved rapidly and the symptoms soon disappeared. The second case, a young man who had had a protracted dysenteric diarrhea, had violent hepatic pain, with marked increase in the size of the liver, and fever. The result of puncture in this case was practically the same as in that of the first. The third case was similar in its clinical appearance to the other, and puncture relieved the man, but he subsequently died outside the hospital from unknown cause. In the fourth patient there were similar symptoms of hepatic abscess following dysentery. Remlinger considers that dysentery is capable of producing acute hepatitis as well as abscess, and the differentiation of these two conditions is extremely difficult. **The most satisfactory measure in diagnosis is puncture**, and this measure is perfectly justifiable because it does good in either case, leading to operation in cases of abscess and relieving symptoms in cases of hepatitis. The cause of such marked improvement after so slight an abstraction of blood is difficult to state.

Acute Yellow Atrophy.—Albu² reports a case of acute yellow atrophy of the liver which **resulted in cure**. The patient was a man of 36, who 3 weeks before he was seen had had great emotional excitement. Following this there was icterus, which had persisted and grown

¹ Rev. de Méd., Aug. 10, 1900.

² Deut. med. Woch., Apr. 4, 1901.

deeper. He was somewhat stupid and had marked fever, but had no tenderness or pain; the liver-dullness was only two finger-breadths in width; the spleen was enlarged. Within a day or two he became extremely delirious, the liver-dullness vanished entirely in the epigastrium, while in the axillary line it was at most two finger-breadths in width, the spleen became palpable, and large amounts of leucin and tyrosin were obtained pure from the urine by Frerich's method. High fever lasted in the case from June 25th to July 8th; it then declined and reached normal on July 13th. The leucin and tyrosin still persisted. On July 14th the liver-dullness was noticed to be definitely broader, the spleen not palpable. The patient left for home 2 weeks later, still showing some jaundice, but otherwise nearly well. Six weeks later he was seen again; and still had slight jaundice, otherwise being apparently wholly well. A month later he wrote that he was in absolutely good health and had no icterus. Albu does not hesitate to state that this was a case of acute yellow atrophy with subsequent rapid regeneration of the liver tissue. He investigated the amount of nitrogen and of urea present in the urine on 2 days because of the supposed relation of the liver to the formation of urea. The nitrogen output was considerably greater than the intake, but the urea nitrogen composed from 75% to 85% of the total nitrogen. This he takes to be testimony against the formation of urea in the liver from ammonia salts.

Intermittent Biliary Fever.—F. Pick,¹ after reviewing the literature and studying 2 personal cases, reaches the conclusion that there is a biliary fever entirely **distinct from that produced by purulent cholangitis**. It shows a rather regularly intermitting fever type, the contents of the inflamed bile-passages are not purulent, and, a point upon which some stress is laid, there has been observed repeatedly a marked diminution in the nitrogen and urea excretion on the fever days, a fact which is in direct contrast with the usual increase of nitrogen excretion when there is fever. This sign, however, has not been observed with any regularity. Charcot and Regnard described it in one case, but were unable to find it in other cases. Pick found it in one case which he observed for a long time, but in the other case it was not observed. Pick observed in the case in which this was present that the ammonia of the urine was not increased, and he believes therefore that the lessened values for urea should not be sought in disturbance of the liver function, but in imperfect production of substances which are formed previous to the ammonia in the course of the elaboration of urea. He believes that this observation speaks against the view commonly accepted that urea is formed in the liver from ammonia salts. In the 2 cases which he observed he noted that the leukocytes were increased only during the periods of fever. In the true purulent cholangitis the leukocytes are found increased even during the periods of freedom from fever.

Fr. Pick² studied the **leukocytes** in a case of Charcot's inter-

¹ Deut. Arch. f. klin. Med., Bd. LIX, H. 1 u. 2.

² Wien. med. Woch., Nov. 3, 1900.

mittent fever, and found the number always normal between attacks, and in the beginning also during the fever periods, though later a passing leukocytosis occurred during the pyrexia. This absence of leukocytosis may be of use in the differential diagnosis of suppurative inflammation of the gall-passages and of liver-abscess. The writer also found that the amount of urea, as well as that of the total nitrogen and ammonia, was lessened, probably due to disturbance of the liver function.

Cirrhosis.—Morano ¹ discusses the occurrence of **preascitic edema** in cases of cirrhosis of the liver. He believes it is due to disturbance of the circulation in the vena cava, produced either through actual advance of the chronic inflammatory process from the liver to the vena cava, or that the vena cava is caught in the sulcus by the sclerosing tissue of the liver; a collateral circulation is ultimately produced, but until this comes into action some edema is observed.

G. Guillian ² describes a case of **hypertrophic sclerosis of the liver and pancreas, with pronounced splenomegaly**. It occurred in a woman of 52 whose previous personal and family histories were good excepting for an attack of smallpox which the patient had had when 10 years old. Several years before she was seen by the reporter jaundice came on suddenly, and had persisted throughout the whole subsequent period, with some variation in intensity. There had been occasional attacks of splenic and hepatic pain. When admitted to the hospital, the liver was found somewhat enlarged, there was marked icterus, and the spleen was enormously increased in size, but excepting for slight digestive disturbance the patient seemed nearly well. Bile pigments were present in the urine at first, but subsequently disappeared, though urobilin and its chromogen were persistently present. After about 8 weeks' observation there was an onset of hemorrhage from the nose, the stomach, and the bowels, and death ensued from this. The autopsy showed marked enlargement of the liver, and the spleen was so greatly enlarged that the organ extended downward to the level of the crest of the ilium. There was a widespread membrane-like thickening of the surface of the spleen. The pancreas was hypertrophied, chiefly about the head of the organ. Upon microscopic examination the liver showed cirrhosis about the portal and biliary channels, the spleen was densely sclerotic about the capsule, and to a lesser degree in the interior. The pancreas showed decided sclerosis, particularly of the interlobular form.

Abscess.—P. W. Bassett-Smith ³ reports a case of abscess of the left lobe of the liver in a man who had recently had dysentery. The pus collection pointed in the epigastric region, and was opened. The postmortem showed that the abscess involved practically the whole of the left lobe of the liver, but there was no secondary abscess. *Amœba coli* was found in large numbers in the pus.

Carcinoma.—Tarchetti ⁴ gives the details of 2 cases of carcinoma of the liver, in which one of the early diagnostic signs was an **enlarge-**

¹ Gaz. degli Ospedali e delle Cliniche, 1900, No. 117.

² Rev. de Méd., Sept. 10, 1900.

³ Brit. Med. Jour., Sept. 1, 1900.

⁴ Dent. Arch. f. klin. Med., Bd. LXVII, No. 5 n. 6.

ment of the supraclavicular and cervical glands. He reviews the literature of the subject and explains why there have been conflicting views among well-known investigators. He also found that the enlarged inguinal glands in 2 cases of abdominal carcinoma did not histologically show any sign of neoplastic growth, but merely a sclerosis, and a substitution of the adenoid tissue by connective tissue. He comes to the following conclusions: "(1) Enlargement of the left supraclavicular glands in the course of abdominal carcinoma is not frequent, but is not so rare but that it should be systematically looked for when cancer is suspected. (2) This enlargement is found not only in connection with cancer of the stomach, but may be present in cases of duodenal or hepatic cancer, and perhaps of cancer of other abdominal organs (pancreas) without any involvement of the stomach. (3) The appearance of the swelling may be early enough to be a valuable aid to diagnosis. (4) Metastasis to the supraclavicular glands makes a sufficiently characteristic picture to be recognized without histologic examination. (5) Slight enlargement and increase in consistency of the cervical and inguinal glands is frequently observed in cancer, but is usually not due to metastasis, and is not of diagnostic value."

D. McKenzie¹ reports the case of a woman of 24 who had a **primary carcinoma of the liver**. One of the most striking symptoms had been **neuralgia of the right arm**, which McKenzie attributes to the anastomosis between the phrenic nerve and the fourth and fifth cervical nerves, the latter of which sends accessory branches to the shoulder and upper arm.

C. O. Hawthorne² directs attention to the fact that **fever may occur in carcinoma of the liver**, and that this sign is therefore not entirely distinctive of impacted gall-stone, abscess, or other conditions in which fever is generally recognized to occur frequently. If the patient exhibits jaundice and enlargement of the liver together with intermittent fever, carcinoma must always be considered. A diagnosis based chiefly on the existence of fever is always subject to serious error.

Sarcoma.—W. Pepper³ reports a case of **congenital sarcoma of the liver and suprarenal**, and calls especial attention to the fact that during a study of the literature upon this subject, 5 other cases were so very similar to his own that he believes they all belong to a "special type of congenital malignant disease, with its own peculiar symptoms and pathologic findings." Pepper's case, a female infant, was found at the age of 1 month to have an enlarged abdomen, which increased in size. The liver could be felt either pushed forward or much enlarged. The child died aged 6 weeks, and an autopsy revealed a uniformly enlarged liver weighing 2 pounds 8 ounces, bulging out below the costal border and filling the abdomen almost completely. The right suprarenal was enlarged to the size of a walnut. The other organs were normal. Sections of the liver showed it to be thoroughly infiltrated—almost transformed, in fact, into a lymphosarcoma, which had not changed the shape

¹ Brit. Med. Jour., Feb. 2, 1901.

² Brit. Med. Jour., Mar. 16, 1901.

³ Am. Jour. Med. Sci., Mar., 1901.

of the organ at all. Small islets of liver-cells remained completely surrounded and compressed by the growth. Section of the suprarenal showed remnants of the gland at the periphery, while the center was composed of the same lymphoid growth, but more hemorrhagic than that in the liver.

Syphilis of the Liver.—Marcuse ¹ contributes a thorough discussion of syphilis of the liver. After a brief historic note he **makes two divisions: hereditary liver syphilis**, which may appear quite early, or late (from the eighth, twelfth, even to the thirtieth year), when it resembles the acquired form; and the **tertiary liver syphilis of adults**, which may be diffused or circumscribed—*i. e.*, gummatous. The hepatitis diffusa resembles the common cirrhosis of the liver and is an overgrowth of the interstitial connective tissue, taking its origin from the capillaries. The surface of the liver presents deep furrows, and may adhere to any of the neighboring organs. The capsule of Glisson is the principal seat of disease. Hepatitis circumscripta, the most characteristic and important form, is marked by retractions, which lead to an increase in the size of the liver, or later to a diminution of the volume. True gummas are present. The clinical diagnosis is made difficult by the variety of forms under which the disease may occur, and because often very slight or no disturbances are occasioned. **Clinically, three varieties** may be differentiated: (1) Early syphilitic icterus in the secondary period; (2) the typical syphilitic liver of the tertiary period; and (3) the late form of congenital lues, which differs only etiologically from the second class. The early syphilitic icterus is a special form of jaundice, which may accompany the secondary signs. It usually occurs within the first 4 months, often synchronous with the exanthem. The prognosis is good, and specific treatment soon dissipates the jaundice. Tertiary syphilis of the liver is in two-thirds of the cases ushered in by gastric and intestinal disturbances. The liver is usually enlarged, —perhaps only the right lobe,—though a diminution in size may occur. The edge is rounded and furrows and nodules as large as hen's eggs can be made out. The most constant symptom is pain in the liver region. Ascites and general anasarca and very rarely icterus may be the result of compression. Practically all the signs and symptoms of syphilis of the liver may occur in cancer or cirrhosis of that organ. Syphilitic furrows and nodules, when well made out, albuminuria and splenic tumor, which never occur in cancer, and indubitable signs of constitutional syphilis are of use in the differential diagnosis. The prognosis is unfavorable; the treatment is a mixed specific treatment.

Hydatid Disease of the Liver.—R. Morrison ² reports a case of hydatid of the liver which was **followed by suppurating hydatid in the left lung**. The symptoms were pain about the right shoulder, which was increased by deep breathing, swelling over the liver, and afterward severe pleuritic pain in the left side. A violent attack of coughing occurred with expectoration of an enormous amount of mucopurulent material. The mass in the right hypochondrium gave a hydatid

¹ Wien. med. Woch., Nov. 17, 1900.

² Lancet, July 28, 1900.

thrill, and the liver was also enlarged. The hydatid cyst of the liver was evacuated, and soon afterward, signs of empyema appearing at the base of the left lung, operation was undertaken, the pus was evacuated, and with it a number of hydatid cysts. The patient had recovered entirely 2 months after the operation.

Calcium Deposits in the Liver.—E. Nihel ¹ reports that in the postmortem examination of the body of a boy of 17, who had died of chronic tuberculosis and nephritis, he noticed that there was grating when he cut the liver. The organ was somewhat small, and had the appearance of a nutmeg liver. Microscopic examination showed that certain areas, which to the naked eye appeared like yellowish-gray stars, showed a marked deposit of calcium salts, apparently calcium phosphate. The deposit was most evident **in the neighborhood of the central vein** and gradually disappeared toward the periphery. The parenchyma in these areas, after removal of the calcium salts, showed marked fatty degeneration. There was a deposit of the salts on practically all the areas where fatty degeneration was at all marked. No similar case could be discovered in the literature, and Nihel gives no explanation of the occurrence of the deposit.

Foreign Body in the Liver.—McConaghey ² reports the discovery of a **needle in the left lobe** of the liver $1\frac{1}{2}$ inches long, no known symptoms having resulted during life. The patient had died of tuberculosis, and the liver was unexpectedly found surrounded by connective tissue. There were no adhesions and no indications of peritonitis. The inner surface of the stomach showed a good deal of pigmentation, particularly in the neighborhood of the pylorus, and it was thought quite possible that the patient had swallowed the needle, that it had then passed through the wall of the stomach, and had subsequently lodged in the liver.

DISEASES OF THE BILIARY PASSAGES.

S. S. Cornell ³ describes a case which occurred in a girl of 20 who about a year before had had an attack of severe pain in the back, which radiated through to the front of the abdomen. The pains had frequently recurred, and were followed by jaundice. The attacks were often accompanied by chilly feelings and succeeded by fever and sweats. The patient became deeply jaundiced, emaciated greatly, the liver and spleen enlarged, and after irregular improvement and relapse she died. An autopsy was not obtained, but the case was diagnosed **chronic catarrhal cholangitis** producing enlargement of the liver and spleen.

Cholecystitis.—W. Fleiner ⁴ discusses the differential diagnosis between cholecystitis and disturbance of the stomach and intestine. He directs particular attention to the fact that ulcers of the stomach or duodenum, or even of the large intestine, may occur as a result of cholecystitis, or at any rate in association with it, and he

¹ Srpski Arch. za Celok. Lekarstv., 1900, No. 10 : Centralbl. f. innere Med., 1901, No. 3.

² Brit. Med. Jour., Feb. 2, 1901.

³ N. Y. Med. Jour., Aug. 4, 1900.

⁴ Münch. med. Woch., 1900, No. 38.

describes cases evidencing this. He insists upon the **importance of a careful history** of the case in diagnosis. There is often a history of a peculiar feeling of tension or a twitching and shivering sensation in the back in cases of gall-stone colic, coming on before the onset of a new attack; also, the pains in biliary colic radiate toward the back and the right side, and there is a characteristic tender point where the right mammillary line passes the border of the ribs. He believes that surgical treatment is indicated when convalescence is not complete; when fever is still present; when a tumor remains behind; when icterus is observed; also in cases in which there are dangerously frequent attacks of colic without the passage of the calculi. Medicinal treatment he considers to consist chiefly in careful attention to the condition of the stomach and intestines, as well as of the bile-passages; alkalies, mineral waters, lavage of the stomach, and oil injections are important, the latter acting as a cholagog and regulating the intestine. **Gastric lavage** he considers important because the water which gains entrance to the intestine is absorbed into the portal system and flushes the liver and the entire body. He considers the influence of gastric lavage important in adhesions about the stomach resulting from cholecystitis, believing that these adhesions are loosened and to some extent broken by the lavage, and motor insufficiency may thereby be largely overcome. It is of importance, however, to use great care and gentleness in such cases, as the gastric mucous membrane is usually in such cases markedly hyperemic and capillary hemorrhages may easily occur.

Cholelithiasis.—H. Ehret and A. Stolz,¹ in reporting some **experimental studies concerning cholelithiasis**, state that the normal bile and gall-bladder of guinea-pigs, dogs, and cattle are by no means always sterile, microorganisms being found in a considerable number of cases. These come as a rule from the intestine, and result from direct invasion from the intestine, though in some cases the bacteria may lodge in the gall-bladder or biliary passages from the blood-channels. In the latter cases, however, the condition is an intermediary one between a normal and pathologic condition. They have **collected 201 human cases** in which the bile has been examined bacteriologically. They particularly refer to the 128 cases of Fraenkel and Krause, in 20% of which bacteria were found. They also refer to the fact that animal injection has shown the presence of tubercle bacilli in a number of specimens of bile which appeared upon culture to be sterile. Of the 73 other cases investigated, there were positive results in 36% to 50%. The authors conclude that **any disturbance of the normal chemic conditions** in the gall-bladder may largely aid the proliferation of the bacteria present in the bile. The same result ensues upon the presence of foreign bodies in the gall-bladder. They refer to the results of Fraenkel and Krause in cholelithiasis, these authors having found the bile sterile but 5 times in 16 cases. They also refer to the importance of typhoid fever in the production of gall-stones as a result of infection with typhoid bacilli. They state finally, however, that there is evidence that the gall-bladder,

¹ Mittheil. aus dem Grenzgeb. der Med. u. Chir., Bd. VI, H. 3; Bd. VIII, H. 2.

once infected, does not necessarily remain infected, as it **may spontaneously overcome infection.**

R. Lucke,¹ in discussing the pain felt in **abdominal colic of various kinds**, states that he considers the pain to be always a result of distention of a hollow viscus, and he believes that the passage of a calculus produces pain by overdistending the viscus and throwing it into spasm, and not by the mere local injury which the calculus may cause.

A. Chautfard² considers that surgical treatment of hepatic colic is too frequently undertaken before medicinal treatment has been properly tested. He also believes that the relief obtained by surgical measures is likely to be only a temporary one, and that the factors which previously caused the formation of calculi still remain present. He considers that the usual mistake is to stop treatment after the acute suffering has subsided. The proper method is to **use prolonged treatment** directed toward reduction of the irritability of the gall-bladder and increase of the circulation of bile, and so far as possible toward obtaining an aseptic condition of the bile-passages. In the treatment he advises chiefly the use of salicylate of soda in doses of 30 to 60 grains a day, watching the effect upon the kidneys and avoiding any cumulative action of the drug. Carlsbad salts may often be added with advantage. He advises the use of this treatment for 9 or 10 days of every month, and then a period of freedom from medication, but continuing this method for a long series of months. He also gives general directions concerning the care of the skin, the use of massage, etc.

Witthauer³ reports very successful results in the treatment of biliary calculi with **olive oil**. He gives about 1-ounce doses by the mouth, adding oil of peppermint so long as the patients are able to continue this, but when it becomes repulsive, he gives the oil by enema, 400 cc. to 500 cc. being used daily at first, the interval then being lengthened. He describes 3 cases in which permanent relief was obtained in this way.

Carcinoma of the Gall-bladder.—A. S. Warthin⁴ reports a case of primary carcinoma of the gall-bladder, in which, besides jaundice, there was **marked melanotic pigmentation of the skin**, the latter being followed by decided vitiligo. The carcinoma of the gall-bladder was probably secondary to cholelithiasis, biliary calculi being found encapsulated in inflammatory tissue near the liver, although the carcinoma growth had covered all traces of the perforation. Warthin thinks with Zenker that the irritation of the gall-stone produces adenoma of the mucosa, which ultimately develops atypically into an adenocarcinoma. The pigmentation of the skin in this case proving to have the characteristics of melanin, and there being marked involvement of the adrenal glands, it was decided that **besides carcinoma** with metastasis **Addison's disease** might justly be diagnosed. Warthin finds no other record of a case in which Addison's disease was

¹ Wien. klin. Woch., July 5, 1900.

² La Semaine Méd., Jan. 2, 1901.

³ Münch. med. Woch., Oct. 23, 1900.

⁴ Phila. Med. Jour., July 7, 14, 21, 1900.

produced by growths secondary to primary carcinoma of the gall-bladder. The combination of vitiligo with Addison's disease is an uncommon one. Warthin studied the changes seen in the skin in the areas of loss of pigmentation, and these were found to be atrophy of the collagenous tissue, papillas, blood-vessels, nerves, and chromatophores with disappearance of the pigment. The elastic tissue was preserved and apparently increased, and had a markedly horizontal arrangement. There were numerous large mast cells.

DISEASES OF THE PANCREAS.

G. V. Zaremba ¹ gives an interesting review of the work that has previously been done upon the **protective influence against intoxications** exerted by the alimentary tract and the glands connected therewith. His own investigations relate to the influence of the pancreas, and particularly to the question as to whether the pancreas of very young subjects has any protective influence against intoxication. It has been fairly satisfactorily demonstrated that the adult pancreas does in some way antidote a certain number of toxic substances, at any rate. It seems probable, from the work that has been done on the question, that this influence is exerted only through actual contact with the toxic material and is not exerted throughout the general circulation, as the introduction of pancreatic juice in one place and of toxin in another place shows no definite influence, while if both are injected together there is an evident antidotal influence. Zaremba found that the pancreas of pups, young rabbits, guinea-pigs, and calves had a pronounced antidotal influence upon diphtheria toxin, and there seemed to be no definite difference between the influence of the pancreas of calves and of full-grown cattle. He investigated the influence of the organ in a number of adult human subjects. His results in these cases were negative, but the negative results, he thinks, were perhaps explained by the fact that the autopsy upon these subjects could be undertaken only a considerable time after death. The pancreas of a boy of $4\frac{1}{2}$ showed decided antidotal effects, however, and in this case the postmortem examination was undertaken within 2 hours after death. The digestive conditions at this age are closely similar to those of adults, hence he decides that the adult pancreas probably will show an antidotal influence if the conditions of the investigations are proper. He showed in a number of very young children who had died with gastrointestinal disturbance or with other forms of disease, that the **pancreas still had marked antidotal influence**, but in 2 cases in which there had been severe gastrointestinal disturbance this influence was not present. He therefore decides that the pancreas of young children does possess antidotal influences, but that these may be lost through the occurrence of certain nutritive disturbances which are as yet not clear as to etiology or actual nature. Zaremba presents a valuable collection of the literature concerning the influence of the gastro-

¹ Arch. f. Verdauungs-Krankh., Bd. VI, H. 4.

intestinal tract and associated glands. The **influence of the saliva** is somewhat doubtful, but in certain cases it seems to have an antidotal effect. The **gastric juice also has an antidotal effect** in some cases; it is less marked than that of the pancreas in some cases, more marked in others. The passage of toxic material through the intestinal wall itself seems frequently to result in a reduction of the toxic action, and probably the normal intestinal bacteria have some effect in reducing the toxicity of poisonous substances formed in the intestines or ingested. The **liver** is generally thought to have a very pronounced antidotal influence, but if the work upon this question be more carefully examined it will be found that this influence varies with different poisons, and while the liver does seem to reduce the toxicity of some substances, it apparently has no influence upon others, and in some cases the toxicity may even be increased. The bile undoubtedly has an antidotal influence in some cases, but this also varies. If, however, the proper conditions of temperature, percentage of bile, and age of the animal furnishing the bile be observed, it will usually be seen that there is a distinct antidotal effect.

Pancreatitis.—E. L. Opie¹ discusses the **relation of chronic interstitial pancreatitis involving the islands of Langerhans to diabetes mellitus**. It has been previously suggested that there is a relation between disease of the islands of Langerhans and diabetes mellitus. Opie states, however, that Ssobolew has given the only previous proof of such a relation in showing that tying the duct of Wirsung caused no change in the islands of Langerhans, while they were found in diabetes mellitus with pancreatic disease to have disappeared. Opie gives the results of his studies of a series of cases of pancreatitis, and divides chronic interstitial pancreatitis into two forms; first, the interlobular form in which the islands of Langerhans are involved only when the process is very far advanced. This group includes those cases resulting from obstruction of the duct. The second form he terms **interacinar pancreatitis**, in which the diffuse process involves the islands of Langerhans. In the congenital syphilitic variety of pancreatitis he finds the islands of Langerhans uninvolved. As to the relation between diabetes mellitus and disease of the islands of Langerhans, while drawing no final and definite conclusions, he directs attention to the following suggestive observations. Eleven cases of interlobular pancreatitis showed in only one instance an association with diabetes. In this instance, which was one of interstitial pancreatitis following obstruction of the duct by calculus, the sclerosis was far advanced, and had involved the islands of Langerhans. On the other hand, 3 cases of interacinar pancreatitis showed in two instances an association with diabetes, and in the other instance association with hemochromatosis. The latter affection is very frequently associated with diabetes in its more advanced stages. In a fourth case of diabetes Opie found **complete hyaline degeneration of the islands of Langerhans**.

C. Priestley² describes a **case of mumps**, in the course of which

¹ Jour. Exper. Med., 1900, No. 4.

² Jour. Am. Med. Assoc., July 7, 1900.

all the symptoms of **acute pancreatitis** were observed. He gives a review of the recent ideas concerning various diseases of the pancreas.

G. Barling¹ reports some cases in which **chronic enlargement of the pancreas** occurred in association with attacks resembling biliary colic, or perhaps produced these attacks. In the 4 cases reported operation was undertaken with the purpose of removing gall-stones that were thought to be present. The head of the pancreas was found to be enlarged in all, and in 2 cases there was found to be complete absence of any disease of the gall-bladder or gall-passages. The enlargement of the head of the pancreas was believed to have caused blockage of the common bile-duct and thus to have produced the colic. He believes that enlargement of the head of the pancreas from mere inflammation might cause obstruction of the common bile-duct. As to pancreatic colic, he considers that this is extremely rare, largely because the muscular power of the walls of the duct of the pancreas is so feeble. If pancreatic colic occurs it is felt chiefly in the lower epigastrium in the center of the abdomen, or near the left costal arch. He considers that the anatomic relation of the pancreas and its duct to the intestine renders it probable that microorganismal invasion of the duct and pancreas from the intestine is a comparatively easy matter, and that probably inflammatory swelling may and does occur early, and that the bile-duct is not very uncommonly compressed in this way, with resulting jaundice.

T. Struppler² discusses **septic processes as complications of necrosis** of the pancreas. He reports 2 cases of fat necrosis which ran their course with the symptoms of sepsis. One followed a verrucose endocarditis, and in the other there was as a complication suppurative pachymeningitis. The author gives a general discussion of the occurrence of septic inflammation in these cases, and the importance of such a condition when operation is considered.

Carcinoma of the Pancreas.—F. A. Baldwin³ reports 4 cases of **primary carcinoma** of the pancreas, and gives a general discussion of this affection. It occurs more commonly in males than in females, though he thinks that White is wrong in his statement that two-thirds of the cases are found in males. He **analyzes 50 cases** which he has found in the literature, and which have apparently not been discussed by others. Of these, 33 occurred in males. Other authors, however, have not reported so high a percentage in the male sex. The disease usually occurs between 40 and 60, but he refers to one case which occurred in a patient of 23, another in a man of 24, and another in a woman of 26, and there were 4 which occurred between 30 and 40. In only 1 of the 50 cases was calculus mentioned as being present. Among the symptoms he refers to rapid emaciation and the common presence of diarrhea, though severe constipation was noted in 9 of his series of cases. Edema was present in 4 of the 50 cases, probably from pressure

¹ Brit. Med. Jour., Dec. 22, 1900.

² Deut. Arch. f. klin. Med., Bd. LIX, H. 1 u. 2.

³ Phila. Med. Jour., Dec. 22, 1900.

on the vena cava. In 1 case there was chylous ascites, from probable involvement of the receptaculum chyli. Petechial spots were present in 3 of the 50 cases. Complete obstruction of the intestine was reported in 2 cases. In 1 case there was an onset and general course resembling an acute infection. A tumor was felt in 16 of the 50 cases. Large amounts of fat were found in the stools in 6 cases, while 6 others showed no excess of fats. Of the 6 cases in which fat was found in the stools, 5 showed at autopsy compression of the pancreatic duct. In the 6 cases in which the stools did not show an excess of fat 1 was a diffuse carcinoma, 2 were located in the head, and the location of the others was not cited. [It is not stated whether the duct was obstructed or not in these latter.] Glycosuria was reported in but 6 of the 50 cases. In the cases reported he emphasizes the fact that intense pain was present in the first, and that microscopic examination showed marked involvement of the nerves by the carcinoma. He also notes that free carcinoma cells were found in this case, and that this demonstrates how easy it would be for vascular metastases to occur. The second case had been diagnosed chronic gastritis, and was treated for this disease with no suspicion of malignancy. The autopsy in this case showed a mass the size of half a cocoanut. The carcinoma apparently arose from the areas of Langerhans. [It is unfortunate in the last case that it is not stated whether there were any clinical evidences of diabetes or not, though the absence of any notes indicating the presence of this affection leads one to infer that it was not present.]

D. L. Edsall¹ discusses the **estimation of the urinary sulphates and of the fecal fat** in the diagnosis of pancreatic disease. He describes a case which was thought clinically, and which proved at autopsy, to be one of carcinoma of the head of the pancreas, with complete obstruction of the pancreatic duct, in which the ethereal sulphates were found to be reduced to as low as 0.085 gram in the 24 hours' urine, and the ratio of the ethereal sulphates to the preformed sulphates was 1 to 29.4. In the second case, in which carcinoma of the pancreas was suspected, but in which the suspicion proved to be unfounded, the sulphates, on the contrary, were found to be absolutely and relatively increased in amount. After reviewing the brief literature concerning the value of a reduction of the ethereal sulphates as a sign of pancreatic disease, he decides that if the sulphates are not reduced the result of the test is of little value, as severe pancreatic disease may certainly exist with normal or increased amounts of ethereal sulphates. If the test is positive, the result cannot be considered to be of great value if there is diarrhea, gastric hyperchlorhydria, or if the patient is restricted to a milk diet, as any of these factors may cause marked reduction of the ethereal sulphates. If, however, such conditions are not present, and more particularly if there is constipation, reduction of the gastric acidity, icterus, grave anemia, cachexia, or a combination of these factors, the test would probably be one of **distinct importance in indicating the existence of disease of the pancreas**, though further studies of its

¹ Am. Jour. Med. Sci., Apr., 1901.

value are necessary. He directs attention to the fact that the teaching of a great many authors concerning the occurrence of fatty stools in pancreatic disease is incorrect. It is commonly said that fatty stools indicate disease of the pancreas; it has, however, been shown chiefly by the work of Müller that fatty stools are much more frequently due to icterus without pancreatic disease, or to severe disease of the intestine interfering with absorption. He reports a case in which it was found that 61.6% of the fat ingested was lost in the stools; and of the total dried feces, 83.8% was fat. The stools themselves had the gross appearance of consisting almost entirely of fat. In this case it was evident, from the further course of the case, that there was no pancreatic disease, and the **steatorrhea was due to the icterus** which was present at the time of the examination. The fat showed the normal amount of splitting in this case, however, which to some extent supports the view of Müller that the fats are normally split up in the absence of pancreatic disease, while this does not occur in disease of the pancreas.

FOOD-POISONING AND GASTROINTESTINAL INTOXICATION.

H. Strauss and H. Philippsohn¹ direct attention to the **importance of the use of a constant diet** in making any investigations of the substances in the urine indicating decomposition within the intestine. They describe a test diet which they used in a **series of investigations**, and then discuss the question of intoxication from the gastrointestinal tract. They made investigations of the quantity of volatile fatty acids and ethereal sulphates in the urine, and also qualitative tests of the phenol and indican. In all, they describe the results of about 100 investigations. Some of the persons investigated were subjects of gastrointestinal disturbance; others were free from such disturbance. They accept the normal value for volatile fatty acids to be between 40 and 80. Alimentary conditions had no constant influence upon the **amount of volatile fatty acids**, even diarrhea not affecting the amount pronouncedly. The only condition which did have a decided influence was constipation, and an influence of this upon the aromatic oxyacids, the ethereal sulphates, the phenol, and the indican was practically always observable. Changes in the gastric secretion had no notable influence excepting upon the **ethereal sulphates**. In cases of hyperacidity they observed values for ethereal sulphates as low as 100 milligrams in 24 hours, and as a rule the values were low with hyperacidity, while they tended to be high with hypoacidity and anacidity. This relation, however, was by no means so constant as to allow of any definite statement. The putrefaction products were markedly increased in 2 cases of disease of the liver. The most interesting and most valuable result of the investigation was the conclusion reached by the authors that the condition of the urine as regards enterogenous decomposition products is much more largely dependent upon the condition of the tissues in gen-

¹ Zeit. f. klin. Med., Bd. XL, S. 369.

eral than upon the condition of the gastrointestinal tract, and they insist that as a rule we have justification for speaking of **tissue intoxication, but not of gastrointestinal intoxication**. Both may be present if the decomposition products are increased, but in a great many instances it is purely a tissue intoxication in that the actual production of these putrefaction products is not increased, but their destruction by the tissues, which is normally carried out to a very large degree, is decreased, owing to abnormalities of the tissues themselves, and therefore the amounts found in the urine are large. In closing the paper the authors note that an increase in the fatty acids of the intestinal contents seemed to increase the acetone excretion.

Leuk¹ discusses the symptoms of **sausage-poisoning, and reports 8 cases**. The symptoms are likely to be severe and prolonged, but their appearance is likely to be postponed for from 12 to 24 hours after eating the sausage. They begin with malaise, discomfort in the epigastrium, nausea, and perhaps vomiting. Diarrhea may occur, and there is likely to be a sense of suffocation. There is prostration, and usually a marked diminution of the secretions in general, with dryness of the skin and mucous membranes. It is not uncommon to observe a diphtheria-like deposit of membrane in the throat. There are often disturbances of vision, and the pupils are usually dilated. A symptom which is very frequent, and which by some authors is thought to be almost pathognomonic, is ptosis. Marked dysphagia is likely to be present, and there often results an inspiration-pneumonia. The voice is hoarse and toneless. There may be strangury and more or less complete suppression of urine. The pulse is small and feeble, and fever is commonly absent. Death is likely to occur in fatal cases in from 8 to 10 days, as a final result of respiratory paralysis. Autopsy shows no characteristic features. Of the 8 cases reported by Leuk 1 died.

E. K. Brown² reports the case of a woman of 27, who was seen while unconscious, with dilated pupils, irregular movements of the eyeballs, and a high temperature. The abdomen was tympanitic and the pulse very rapid. The temperature rose, but soon fell to about 90° F. and the patient went into collapse. She **had eaten sausages 2 days before** her illness began, and 2 other persons who had eaten of the same sausages had severe gastrointestinal disturbance. Postmortem examination in this case showed marked inflammation of the serous coat of the small intestines, with petechia in the duodenum and stomach, and severe inflammation of the mucous membrane, with some exudation of lymph in the peritoneal cavity. The inflammation of the small intestine was confined to the serous lining.

G. L. H. Burger³ describes 2 cases of what he considers **ptomain-poisoning from eating cheese**. Both occurred in small boys, who had severe abdominal cramps with gastrointestinal disturbance and prostration some hours after having, with the other members of the family,

¹ Münch. med. Woch., Sept. 25, 1900.

² Lancet, Feb. 9, 1901.

³ Med. Rec., Nov. 17, 1900.

partaken of some cheese. The cheese was investigated and found to cause marked gastrointestinal disturbance in dogs and cats, and it is stated that "a small quantity of substance given off after precipitation with an alkali and solution in ether gave a precipitate with platinum chlorid"; this was considered to be an alkaloid formed in the cheese.

H. L. Winter¹ considers that **postapoplectic temperature** is usually due to absorption of toxic material from the torpid digestive tract. In its treatment he advises the use of the peroxid of hydrogen by the mouth in dram doses. This drug he thinks stimulates digestion and prevents fermentation. He found that it reduced temperature after apoplexy, and particularly the temperature of the affected side. [This suggestion as to the cause of the temperature, like many other suggestions depending upon gastrointestinal intoxication, is unsupported by facts and not very probable.]

DISORDERS OF THE URINE AND DISEASES OF THE KIDNEYS.

METHODS OF EXAMINATION.

S. Goldflam,² in examining the kidneys, uses a method which he calls **succussion**, the patient standing with the body bent somewhat forward, the examiner placing his clenched fist with the ulnar side of the hand against the lumbar region, and making thrusts against this region. The result is to cause more or less pain in some renal affections, particularly in calculus, pyelitis, tuberculosis, abscess, and tumor. He considers this method of examination of some importance in the determination of the existence of surgical conditions of the kidney.

Lenhoff³ draws attention to the fact that the kidneys must be examined both **when the patient is upright and when horizontal**, to determine the relation between the body and the position of the kidneys.

Casper and Richter⁴ have found that a valuable **index to the functional capacity of the kidneys** is the elimination of sugar after the administration of phloridzin. The sugar is believed to be produced in the kidneys, and the amount produced is therefore an index to the functional capacity of the kidneys. It was found that a diseased kidney produced a much smaller amount of sugar than the normal kidney, and in the case of advanced disease the elimination of sugar drops practically to zero. The difference between the two kidneys is not seen if both are markedly diseased. The elimination of sugar and urea and the molecular concentration of the urine run practically parallel as a rule, but the sugar elimination after phloridzin injection is considered more delicate than any of the other tests.

L. Lipman-Wulf⁵ gives a somewhat desultory discussion of the use of **methylene-blue** for the determination of the secretory function of

¹ Med. News, Sept. 15, 1900.

² Berlin. klin. Woch., Jan. 14, 1901.

³ Wien. med. Woch., Nov. 10, 1900.

⁴ Berlin. klin. Woch., July 16, 1900.

⁵ Deut. med. Woch., Jan. 17, 1901.

the kidneys. His investigations showed that methylene-blue gave most varied results in apparently normal animals, the dye appearing in the urine any time from $\frac{1}{2}$ hour to 6 hours after its administration, and the excretion lasting from 24 hours even up to 100 hours. Bard and others have stated that there are two forms of disturbance of the kidneys; in one, chiefly seen in interstitial nephritis, there is an abnormally slow excretion; in the other, parenchymatous nephritis, there is an abnormally rapid excretion. Lipman-Wulf produced degenerative changes in the parenchyma of the kidneys by injecting cantharidin, and by other methods, and then investigated the excretion of methylene-blue. He was not able to corroborate the statements of Bard. His results were rather to the contrary, the excretion being often slow after degeneration of portions of the parenchyma. He admits, however, that it is quite possible that certain portions of the kidney alone are concerned in the excretion of methylene-blue, and that observing the excretion of this or other dyes may prove to be of some value through its indicating disease of special portions of the kidney.

A. Praum¹ recommends, as a refinement in determining whether small amounts of albumin are present in urine which is not perfectly clear, the addition of a reagent like sulphosalicylic acid to filtered urine in a test-tube. Another portion of urine without the reagent is placed in the filter and allowed to flow from the funnel gently down the tube and to float above the heavier mixture of urine and reagent. A **comparison of these two portions of urine** will readily show whether the reagent has produced even a slight cloudiness in the first portion of urine.

F. Pröscher² recommends the use of Ehrlich's **diazo reaction for the demonstration of bile in the urine**. The test, as he describes it, is carried out by saturating 10 cc. of urine with ammonium sulphate, collecting the pigmented precipitate on a small filter, extracting the pigment with 95% alcohol, strongly acidulating the extract with HCl, and then carrying out the diazo reaction with this. If bilirubin is present the fluid becomes a striking blue, and if caustic potash solution is added to this the color becomes red at the neutral point, and a striking green when the fluid becomes alkaline. The same reaction may be used to demonstrate the presence of bilirubin in blood-serum if the serum-albumin is first precipitated out with alcohol. He states that this test will show the presence of 1 part of bilirubin in 60,000 parts of fluid. It is important to precipitate the pigment with ammonium sulphate and then test the extract, as, if the urine itself is used, other substances present may interfere with the reaction. The reaction is specific for bilirubin, and is not obtained with other bile pigments. [Our experience with this test, which is slight, has as yet been unsatisfactory.]

O. Nägeli³ has made a careful investigation of **various titration indicators** in relation to their value in determining the acidity of the

¹ Deut. med. Woch., Apr. 4, 1901.

² Centralbl. f. innere Med., Feb. 16, 1901.

³ Zeit. f. physiol. Chemie, Bd. xxx, S. 313.

urine. He finds that phenolphthalein is the only indicator that gives a sharp distinction of the neutral point in solutions of acid sodium phosphate. A similarly exact result was obtained by this indicator, but by it only, in titrating calcium phosphate, sulphates, urates, and oxalates; it also indicated the CO_2 which was set free. Hence, in determining the acidity of the urine he recommends that one take 10 cc. and add 1 to 4 drops of phenolphthalein and titrate with decinormal sodium hydrate until there is a distinct red color. This may be determined by comparing the color with that of a control specimen. If the urine shows too deep a color it should be diluted or decolorized with animal charcoal. The results are useless if there has already been a production of ammonium carbonate through reduction of the urea, hence thymol should be added to the urine to preserve it.

T. R. Brown¹ discusses urinary hyperacidity as a **cause of severe bladder irritation**, and as an ultimate cause of actual severe organic lesions of the bladder. He describes a series of such cases, in some of which the symptoms had persisted for years. The use of alkalis until the urine was neutral or had been rendered alkaline caused the condition to grow better. He used direct titration with sodium hydrate and phenolphthalein, considering this sufficiently exact for clinical purposes.

H. Kümmel² recommends the **determination of the freezing-point** of the blood and of the urine in determining the condition of the kidneys, and particularly the determination of the freezing-point of the urine as obtained from the two ureters, by catheterization of the ureters as a means of showing which kidney is affected.

Strubell³ has modified Pulfrich's **immersing refractometer** for the estimation of the index of refraction of fluids, as blood and urine, and his results give hope that it may be used for medical purposes as it has been in veterinary work.

K. Walko⁴ has investigated the **iodin-combining power of the urine**—i. e., the number of grams of iodine with which 100 grams of dry residue of urine will combine. He found that the presence of free alkali and ammonia was of great importance. The result increased rapidly with rapid absorption of alkaline transudates and after large hemorrhages, also in the early days of croupous pneumonia, at which time the urine has a marked alkaline reaction. There is also an increase during digestion. He tested a large series of substances as to their iodin-combining power, and found that the combining power of the urine was increased by H_2S , salts of the fatty acids, leucin, tyrosin, uric acid, and a number of the xanthin bases, albumins, phenols, homogentisic acid, pigments of the urine and bile, and most of the alkaloids. The highest results were found in a case of diabetes mellitus. Abnormally small results were found in persons who had taken iodid of sodium. Walko decides that, since such a large number of substances do increase the combining power of the urine, this is not even an approximate measure of the amount of any individual metabolic products found

¹ Phila. Med. Jour., Mar. 2, 1901.

³ Wien. med. Woch., Oct. 27, 1900.

² Münch. med. Woch., Oct. 23, 1900.

⁴ Zeit. f. Heilk., Bd. XXI, H. 2.

in the urine, nor of the total sum, and that the method has **no importance in diagnosis.**

GENERAL CONSIDERATIONS CONCERNING RENAL DISEASE.

R. Magnus,¹ in a communication concerning the **relation of plethora to diuresis**, notes that Starling in particular has claimed that the injection of salt solutions increases diuresis through the production of plethora. Magnus claims, on the contrary, that the diuresis is not due to the plethora, but to the increase in the salts or the water of the blood; in other words, to a change in the constitution of the blood. In order to prove this, he produced an actual plethora by transfusing dogs with dogs' blood without defibrinating the blood, injecting from 33 % to 70 % of the total amount of blood contained in the animal. As a result there was practically no change in the excretion of urine. Hence transfusion does not increase diuresis. To show that the transfusion did cause an actual plethora, he determined the hemoglobin before and after the transfusion and showed thereby that there was an actual increase in the bulk of blood circulating in the animal's vessels, though evidently a certain quantity of the fluids of the transfused blood had left the vessels. Hence plethora does not cause diuresis. The arterial and venous pressure were both greatly increased by the transfusion, which is to his mind sufficient testimony that increase of pressure in the general circulation does not increase diuresis. Also, it was evident that the blood-pressure in the kidney was increased, as shown by the onkometer; hence there could have been no vasoconstriction of the kidneys as a result of the transfusion. And, finally, to show that change in the constitution of the blood will produce diuresis, he first injected animals with a solution of Glauber salts, and then transfused the same animals and found that the combined procedures did cause a very marked increase in the secretion of urine. As noted, a certain amount of the fluid of the blood transfused seemed to pass from the vessels into the tissues very rapidly. The blood transfused was practically of the same constitution as the blood of the animal operated upon, hence the passage of fluid into the tissues could scarcely be attributed to diffusion and osmosis. There is no reason to believe in the secretory power of the capillary cells, and Magnus therefore considers that the passage of the fluid was **due to mere filtration**, and occurred for the purpose of ridding the vessels of the excess of fluid.

R. Gottlieb and R. Magnus,² after investigating the **relation between the pressure in the ureter and diuresis**, reach the conclusion that an increase in the ureteral pressure very often occurs with diuresis, and is then undoubtedly due to the diuresis. It is not a constant result of diuresis, however, hence the relation between ureteral pressure and diuresis is a somewhat complicated one. It is not dependent upon

¹ Arch. f. exper. Pathol. u. Pharm., Bd. XLV, H. 3 u. 4.

² Arch. f. exper. Pathol. u. Pharm., Bd. XLV, H. 3 u. 4.

changes in the blood, as claimed by Ludwig and Starling. The chief factors upon which it is probably dependent are the activity of excretion of urine and the degree of negative pressure in the pelvis of the kidney, two variable factors. The active secretory power of the kidney elements, however, plays an important part in causing changes in the ureteral pressure.

R. Gottlieb and R. Magnus ¹ have investigated the **influence of the renal circulation upon the diuresis**, and decide that while there is oftentimes an increase of diuresis with increase of the renal circulation, this relation is a very irregular one, and sometimes the contrary is observed. As a rule, in their experiments, if the diuretic was given in one large dose, the diuresis increased with the circulation, but the administration of the diuretic in smaller doses over a longer time was often not associated with the same increase of the renal circulation. In chloralized animals in particular they observed an absence of association between increased renal circulation and diuresis, hence chloral seemed to disturb the relation between active renal function and active renal circulation; but this was also observed when chloral was not used. They think that diuresis is dependent upon the active functioning of the proper renal tissues much more than upon alterations in the circulation. They carried out their experiments more particularly with caffeine, and since this drug sometimes caused vasomotor dilation and sometimes did not, even though diuresis ensued, they conclude that caffeine exerts its diuretic action through influencing the secretory activity of the proper kidney tissues rather than through causing changes in the renal circulation.

V. E. Mertens ² contributes an extremely interesting report concerning the **source of albumin in the urine in nephritis**. He believes that he has demonstrated definitely by a biologic method, that this albumin is **derived directly from the blood**. His method was that of producing an antiserum in the serum of rabbits by injecting them with human blood-serum; he demonstrated that addition of the blood-serum of the rabbits would cause a cloudiness in human urine containing albumin, while the rabbits' serum had no action upon rabbits' blood, or upon the urine of a rabbit that had been poisoned with cantharidin and had albuminuria. He also injected urine containing albumin into the ear vein of a rabbit, and found that this rabbit's blood-serum reacted to human albuminous urine as well as to human blood-serum. He believes that this definitely proves that the albumin in urine is derived from the blood, and he also thinks that his results will answer positively the question put by others, whether the injection of transudates into animals would have the same result as the injection of blood-serum. He also thinks that it is quite possible that the injection of albuminous urine may become a method of importance in the production of antisubstances in the blood-serum of animals, as such urine is easier to obtain than either human blood-serum or human transudates. Mertens also

¹ Arch. f. exper. Pathol. u. Pharm., Bd. XLV, H. 3 u. 4.

² Deut. med. Woch., Mar. 14, 1901.

made the interesting observation that a new-born rabbit, the mother of which had been injected with albuminous human urine, showed the same substances in its blood-serum, the serum reacting in very small amounts with a solution of human blood and with human albuminous urine.

G. Zuelzer¹ states that, working independently, he has entirely **confirmed Mertens' work** concerning his biologic reaction for albuminous urine. His method differed from Mertens' in that he used subcutaneous injections while Mertens used intravenous injections. Rabbits treated with albuminous urine always showed in their blood-serum some substances which reacted with human albuminous urine, but with no other form of urine. He considers, however, that this justifies one in concluding only that there is in the blood and albuminous urine a form (or perhaps several forms) of albumin of identical nature, but does not indicate definitely, as Mertens states, that the albumin of the urine comes from the blood.

Métin,² in investigating the **elimination of bacteria** by the liver and kidney, reaches the conclusion that, so long as these organs are uninjured, bacteria do not pass them. He injected guinea-pigs subcutaneously with a series of microorganisms and then aspirated the urinary bladder with an aspirating syringe, taking care not to wound blood-vessels in the bladder-wall. In a similar manner he obtained bile from living or dead animals. If blood were not mixed with these two fluids they never contained bacteria. He admits that bacteria may gain entrance to these secretions if the epithelium is diseased, but considers that they cannot otherwise.

C. F. Martin and F. B. Jones,³ in discussing the frequency of **renal casts without albuminuria**, and their importance in diagnosis, present a table of 46 cases in which casts were found in the urine, while albumin was in most of the cases absent. These cases were found in a series of 80 examined in the routine way. The diagnoses in the 46 cases were very varied, including both acute and chronic constitutional conditions and infections. They decide that it is difficult to estimate the true importance of casts, and their occasional occurrence without other significant symptoms does not seem to indicate any gravity in the prognosis of the case, more particularly when the casts are hyaline or only slightly granular. Epithelial casts are of more serious importance. The one fact which seemed very well shown by their observations in these cases was that irritative conditions are those which are commonly associated with the excretion of casts without signs of nephritis, as, for instance, the excretion of bile through the urine, and the elimination of toxins in tuberculosis, pneumonia, and typhoid fever. They consider that casts are unquestionably more frequently found in the absence of albumin than is commonly believed.

¹ Deut. med. Woch., Apr. 4, 1901.

² Ann. de l'Institut Pasteur, 1900, No. 6.

³ Phila. Med. Jour., Sept. 8, 1900.

DISORDERS OF THE URINE.

Indicanuria.—J. Bouma ¹ has made an investigation of the **amount of indican in the urine** of normal and abnormal persons, using Wang's method. He believes that chloroform dissolves no other pigment than those belonging to the indigo group. The results of titration with permanganate of potassium corresponded closely to those obtained by gravimetric methods. In normal persons he found from 3 to 8 milligrams in 24 hours. In pathologic urines he found as much as 5 milligrams in 100 cc. He especially directs attention to the large quantities found in cases of chlorosis, and to the fact that the quantity decreased as the patient improved.

Gilbert and Weil ² found a slight indicanuria in 6 normal adults out of 10 cases examined, and **produced it experimentally** by the use of crystallized indol. Simultaneous ingestion of indol and of extract of pig liver, as well as that of indol and 150 grams of syrup of sugar (?), did not in any way change the elimination following the administration of indol alone.

Wolowski ³ reports a method for the **quantitative estimation of the indican** in the urine which depends chiefly upon the preparation of solutions of calcium hypochlorite of various strengths which are definitely known, and the addition of these solutions drop by drop to portions of urine in test-tubes; the determination of the amount of hypochlorite that it takes to colorize the urine completely after producing a color reaction indicates the amount of indican present. The test can be carried out within half an hour, and he states that it is entirely satisfactory for clinical purposes. He insists upon a close relation between indicanuria and a series of diseases, particularly nervous affections, skin eruptions, some cases of asthma, and, particularly, vertigo. [The author has a very remarkable way of stating that the indicanuria was the only "cause" of many diseases investigated, because with variations in the amount of indican the disease showed corresponding variations, and with the disappearance of the indican the patients recovered. Indicanuria, however, is at best only an index of the absorption or imperfect destruction of a considerable amount of indol, and indol is even in large quantities scarcely at all toxic. The statement that indicanuria is the "cause" of illness is curiously inexact. At most it is the indication of some abnormality.]

Oxaluria.—H. Baldwin, ⁴ after an **experimental study of oxaluria**, with particular reference to its fermentative origin, reports that she has confirmed the observation of others that the amount of oxalic acid normally excreted is in direct relation to the **amount of oxalates in the food**. The daily quantity varies from a few milligrams up to as high as 30 milligrams, and averages about 10 milligrams. In normal persons, with food free from oxalates, oxalic acid is not found in the

¹ Nederl. Tijdsch. voor Geneeskunde, 1900, Bd. I, p. 209.

² Gaz. Hebdom. de Méd. et de Chir., July 19, 1900.

³ Deut. med. Woch., Jan. 10, 1901.

⁴ Jour. Exper. Med., 1900, vol. v, p. 27.

urine. In some disturbances which are as yet of indefinite nature, but which occur particularly when free HCl is absent from the stomach-contents and where there is marked fermentation in the intestine, oxalic acid is found in the urine even though the food be free from oxalates. She was able to cause such a condition in dogs by feeding them for a long time with large amounts of glucose. Under such circumstances she also found oxalic acid in the stomach-contents.

L. Scott¹ recommends the administration of small doses of magnesia over a long period, together with some mild diuretics such as the citrate of potassium in the **treatment of oxaluria** and oxalic calculi. The patients should also be carefully dieted and should carefully attend to the general hygiene of their lives.

Phosphaturia.—A. Robin² contributes a thorough article upon the earthy **phosphaturia of dyspeptics**, based upon a complete study of 12 cases of permanent hypersthenic dyspepsia. After detailing the clinical aspect of the cases, as well as the examination of the stomach-contents and of the urine, he comes to the following conclusions: (1) Patients with milky emissions, heretofore wrongly considered cases of stone, of phosphaturia, or of neurasthenia, are simply cases of periodic or permanent hypersthenic dyspepsia, in which a phenomenon which is irregularly present in most hypersthenic cases is exaggerated and becomes permanent. (2) The two classes of these patients are **those that have irregular milky emissions and those that pass a thick, chalky liquid** at the end of micturition, or chalky concretions which often cause very painful vesicourethral crises. (3) In addition to the milky emissions and the painful paroxysms, the most frequently observed symptoms are those of a nervous, cardiac, cutaneous, and muscular nature. They make up a characteristic ensemble, which, added to the usually overlooked gastric trouble, assures the diagnosis. (4) The analysis of the stomach-contents shows an intense hyperchlorhydria, little fermentation, sufficient peptonization, but a very faulty digestion of the starches. (5) General metabolism and the interchange of nitrogenous matter are not much disturbed, but the evolution and transformation of ternary substances are appreciably retarded. (6) These patients **have not phosphaturia, in the true sense of the word**, as an increase in the total phosphoric acid for 24 hours and per kilogram of body weight, as well as its proportion to the total nitrogenous matter, is rarely observed. The earthy phosphates are increased, and their ratio to the total phosphoric acid is considerably augmented. (7) The precipitation of calcium phosphate in the bladder, and perhaps also in the calices and Bellini's tubules, is a condition favoring the development of cystitis, pyelitis, pyelonephritis, and hematuria in certain cases. (8) Albuminuria is of frequent occurrence. (9) Anemia is a frequent complication. The writer goes fully into the treatment of the disease itself, of the crises, and of the complications. A milk diet for about 2 weeks is followed by a proper diet and hygiene. If acid medication is not well borne, an alkaline-earth powder is used. Arsenate of soda, caeco-

¹ Brit. Med. Jour., Oct. 13, 1900.

² Bull. de l'Acad. de Méd., Dec. 4, 1900.

dylate of soda in subcutaneous injections of 0.05 gram, the hypophosphites, and the glycerophosphates can all be tried. During convalescence, iron, strychnia, and hydrotherapy are of value.

Chyluria.—F. Erben¹ describes a case of chyluria, in which he believes that he has demonstrated definitely that the **fat excreted was chyle fat**, because 12 hours' hunger caused the urine to become practically free from fat, and 2 or 3 hours after taking further nourishment fat was again present in considerable amounts. The urine also became free from fat, or almost free, when sufficient quantities of nourishment containing no fat were given. He also observed that fats stained with Sudan soon appeared in the urine still showing the stain, an evidence that it was the same fat that had been ingested. The amount of fat in the blood was not changed. The amount in the urine varied from 5 to 30 grams per day. It consisted largely of neutral fat. He also showed the presence of monoxystearic acid, and considers that this was produced from oleic acid through the action of ferments or bacteria in the intestine or intestinal wall. The fats in the urine contained also a certain amount of free fatty acids. The lecithin was about 0.56%, the cholesterolin 1.7%.

Bence-Jones Body.—Magnus-Levy² considers the Bence-Jones albumin substance to be, **not an albumose**, but a product nearly related to the true albumins. He thinks this substance may be produced in the intestinal wall or in the liver.

S. Kalischer³ reports a case of **myeloma of the ribs** in a woman of 67, in which there was the usual course, the symptoms consisting chiefly of neuralgic pains about the ribs, which increased greatly, and which ultimately interfered largely with breathing. There was some spontaneous fracture of the ribs and formation of nodules on the ribs ultimately. Diagnosis was made almost entirely through the presence in the urine of the Bence-Jones body. The reaction observed was the usual one—precipitation upon the application of moderate heat, resolution upon boiling, and precipitation upon cooling. The amount present was 0.55%. Death occurred about 1½ years after the onset of the first symptoms. Postmortem examination confirmed the diagnosis, the marrow of the ribs being transformed into a substance resembling soft splenic pulp. Kalischer draws attention to the interesting fact that in almost all cases even widespread involvement of the marrow, as in this case, has been associated with **no notable changes in the blood**, and on the other hand that widespread involvement of the marrow in cases of leukemia, pernicious anemia, etc., has usually been unassociated with the presence of Bence-Jones body in the urine. The nervous symptoms frequently seen in these cases are due to several causes. They may be purely functional, they may be due to pressure of growths, and they may at times be due to actual changes in the central nervous system, or due to metastases or toxic influences.

¹ Zeit. f. physiol. Chemie, Bd. XXX, S. 436.

² Wien. med. Woch., Nov. 10, 1900.

³ Deut. med. Woch., Jan. 24, 1901.

Hemoglobinuria.—L. Michaelis¹ reports an **unusual case of hemoglobinuria**, and makes an extremely interesting suggestion as to the possible cause of the hemoglobinuria. He believes that the case illustrates a previously undescribed form of hemoglobinuria—*i. e.*, a “**posthemorrhagic hemoglobinuria.**” The subject, a woman of 41, had suffered from rupture of an extrauterine pregnancy, and had a large effusion of blood in the free abdominal cavity. This blood was rapidly absorbed, and for 2 days after the accident she had hemoglobinuria; there was then a cessation for several days, and then for 4 days another attack of hemoglobinuria. Michaelis’s explanation of the condition is that, the blood being rapidly absorbed, a **large quantity of hemolysin (antolysin) was set free into the circulation**, and that as a consequence a considerable number of blood-corpuscles were destroyed and hemoglobinemia and hemoglobinuria resulted. The reason that this does not occur frequently in hemorrhages is probably because the hemorrhages are very slowly absorbed, and the autolysin set free is rapidly neutralized by antiautolysin. In this case the absorption of blood was so rapid that the tissues could not provide enough antiautolysin. One other explanation that Michaelis thought of was the mere absorption of large quantities of blood and the excretion of the hemoglobin contained therein unchanged. Were this the case, however, Michaelis thinks that a posthemorrhagic hemoglobinuria of some degree would necessarily be far more frequent.

Martini² apparently demonstrated in a case of paroxysmal hemoglobinuria that the attacks of hemoglobinuria were due to **abnormal increase in the globulicidal action** of the blood plasma. If the blood plasma of the patient were mixed with the blood of normal persons, extremely marked changes in the blood-corpuscles of the latter occurred, the corpuscles shrinking, the hemoglobin in large part passing out into solution, the blood-corpuscles clumping, and their number being reduced from 4,000,000 or 5,000,000 per cubic millimeter to 1,000,000 or below. The action of the blood-serum of this patient was, therefore, similar to that of a foreign species. The blood-serum of normal persons, on the contrary, was without harmful action upon the blood-corpuscles of other normal persons or the blood-corpuscles of the patient with hemoglobinuria. If the attacks after the hemoglobinuria reached a maximum and had begun to decrease, or the hemoglobin had disappeared from the urine, there were found large amounts of urobilin. Hence it seemed that when there was a large amount of hemoglobin in the blood it appeared in the urine as hemoglobin, but when the amounts were smaller it appeared in the urine as urobilin. The patient showed a reduction of red blood-corpuscles to about 2,000,000, and Martini considers that this indicates that the erythrocytes differed in resisting powers and only those which were very resistant could withstand the globulicidal action of the plasma. The attacks were, he thinks, not due to any permanent change in the red corpuscles, or directly to the pecu-

¹ Deut. med. Woch., Jan. 24, 1901.

² La Riforma Med., 1900, Nos. 267 and 268.

liar hemolytic action of the blood plasma, for the plasma was markedly globulicidal in its action upon normal blood at all times. The attacks were therefore due to a **reduction in the resistance of the red corpuscles** at these periods, and not to an increase in the globulicidal action of the plasma. The origin of the change in the blood plasma could be only theorized upon. Martini believes it is probably the result of the production of some autotoxic substance in the body.

E. Chiaruttini¹ observed in a case of paroxysmal hemoglobinuria that the blood-serum between the attacks had a **marked globulicidal action**, but the blood-corpuscles of this person, when treated with blood-serum of others, showed no change from normal conditions. He believes with Hayem and Viola that hemoglobinuria is due in such cases to the globulicidal action of the blood plasma.

J. H. Musser and A. O. J. Kelly² describe a case of **hemoglobinuria complicating typhoid fever**. This occurred in a colored man of 21, who was admitted to the University Hospital on August 30th, and whose history showed nothing of importance. He had not had any hemorrhage before admission, even the common symptom epistaxis having been absent. Upon admission, however, he showed some jaundice, besides the usual symptoms of typhoid fever; the disease had apparently been present for only a few days. The urine at that time was claret-colored, had a specific gravity of 1.035, contained one-fifth albumin by bulk, and "examination revealed the coloring matter to be hemoglobin." The urine contained hemoglobin until September 6th. At this time it was noted that the hemoglobin of the blood was reduced to 15%, and the red blood-corpuscles to 2,430,000, while the leukocytes throughout this whole period were about 8800. Two days later the blood-count showed a slight increase of hemoglobin, 3,290,000 red cells, and 11,760 leukocytes. The patient was irrational during the latter part of the course of the fever, but recovered entirely without any further complications. The last blood-count, made on September 25th, showed 55% of hemoglobin, 2,920,000 red cells, 5229 leukocytes. The use of cold baths in this case seemed to have no influence upon the hemoglobinuria, as the latter was present upon admission and disappeared in spite of the use of cold baths. But few cases of hemoglobinuria in typhoid fever have been reported, and most of those reported have terminated fatally. This case, excepting for the hemoglobinuria, showed no evidences of marked severity.

Hematuria.—Schwabe³ reports a case of hematuria in which he used **subcutaneous injection** of about 6 drams of a 2% **solution of gelatin**, and afterward gave gelatin solution by the mouth. The hemorrhage decreased immediately after the injection, and had entirely disappeared within a week.

Hahn⁴ reports a case of hemorrhage from the kidneys in a hemophilic subject, in which he was able to control the hemorrhage by giving

¹ Arch. per le Scienze Med., vol. XXIV, No. 4.

² Phila. Med. Jour., Jan. 19, 1901.

³ Therap. Monatshefte, 1900, H. 6, S. 311.

⁴ Münch. med. Woch., 1900, No. 42.

the patient as much as 200 to 250 grams of **gelatin** per day in the food. The previous methods of treatment had been apparently without result.

Schwabe¹ reports a case of severe hematuria in which the hemorrhage was from the kidney, and which was very successfully treated by **gelatin injections**. Schwabe thinks that while this case does not show that this method of treatment will always be satisfactory, it does demonstrate that it is not always contraindicated in such conditions, but would rather appear to be indicated, and that it is deserving of further trial.

F. S. Rucci² recommends as a **new method for the use of gelatin** for hemorrhage the rectal injection of a 2% solution. This he claims is more rapidly absorbed than when given by subcutaneous injection, and has a satisfactory action, which appears within a few minutes.

DISEASES OF THE KIDNEYS.

Nephritis. — R. Laspeyres³ contributes a study of the **relative amounts of urine passed during the day and during the night**, and discusses their relation to diagnosis in cases of cardiac and renal disease. As to cardiac disease, he states that so long as the vascular system is good the amount of urine passed during the night remains, as it should be, much less than that passed during the day. When vascular changes are present with the cardiac changes, the amount of night urine is often equal to, or sometimes greater than, that of the day. In acute renal conditions the relation of the night urine to that of the day is normal; in chronic nephritis with cardiac disturbance, however, and in contracted kidney, the nocturnal amount is much increased. He thinks observation of this point is of importance in some cases in determining whether the condition present is an acute nephritis or an acute exacerbation of a chronic nephritis. In one case he made a diagnosis of chronic nephritis with acute exacerbation merely upon this sign, and the diagnosis proved correct. He could not see that hypertrophy of the prostate resulted in any increase in the amounts of the nocturnal urine. The relative conditions were normal in diabetes mellitus, also, excepting in cases in which arteriosclerosis was present.

C. W. Purdy⁴ discusses the **prophylaxis and management of interstitial nephritis**. He investigated the kind of patients in which interstitial nephritis is likely to occur, and found that they are usually persons who have large appetites, and who particularly use an excess of proteid foods and lead sedentary lives. In prophylaxis of the disease he recommends the elimination of proteids, meat being given about once a day, and leguminous vegetables being largely avoided. The appetite should be restrained, and there should be systematic daily exercise, the

¹ Therap. Monatshefte, 1900, No. 6.

² Gaz. degli Ospedali e delle Cliniche, 1900, No. 114.

³ Dent. Arch. f. klin. Med., Bd. LXVIII, H. 1 u. 2.

⁴ Jour. Am. Med. Assoc., July 28, 1900.

exercise being begun as massage and passive exercise if necessary. In the treatment of the disease after it is established the same rule should be followed. Care should be given to the condition of the heart, managing a tendency to hypertrophy by nonnitrogenous diet and saline laxatives; while if the heart tends to be weak it should be relieved of strain and heart tonics used, and the iodids and nitrites should be given to produce dilation of the vessels. In such cases the patient should be put at absolute rest, given digitalis, and afterward, if he improves, the Schott treatment should be used.

Stepler¹ reports the case of a man of 20 who, together with the usual symptoms of secondary syphilis, showed the signs of a marked acute nephritis, the albumin in the urine amounting to as much as 1.2%, and the patient showing widespread anasarca, with effusion into both pleuras and into the abdominal cavity. The signs of nephritis disappeared entirely under antisyphilitic treatment, and the patient was discharged entirely well. The nephritis was considered to be **due to the syphilis**.

Hydronephrosis.—B. Bertenson² discusses the **pathologic anatomy** of experimental hydronephrosis. He tied the ureter on one side in rabbits and dogs, and states that he was able to discover as a result of this that the normal kidney on the other side did not possess sufficient activity to accomplish the required amount of work, hence there was a rapid hypertrophy of all the kidney elements and a widespread marked hyperplasia of the cell elements, and probably also of the tubules and glomeruli themselves. Regressive changes, such as those observed in nephritis, were observed in the parenchyma. The liver became increased in size in proportion to the increase in the hypertrophy of the kidney. The blood-vessels of the brain were found to be extremely full.

Renal Calculus.—Spiegel³ investigated 44 stones removed from the kidney. He found but 6 of these to be homogeneous in structure. Calcium carbonate was the most common salt found, and was present in about 60%; the phosphates were next most common, and after this oxalates and urates. Other salts were comparatively rare. The salts were found in layers, concentrically arranged, a layer of one form of salt being superimposed upon another. The oxalates were always found when the urine had been acid in reaction, and in cases in which there was much uric acid or urates.

DISEASES OF THE BLADDER.

Zaudy⁴ describes a case of paraplegia in which, in spite of abscess of the prostate and peritoneum, and purulent infection of the urethra, the autopsy showed but a slight irritation of the mucous membrane of the bladder and no inflammation of the urinary passages above this. This absence of infection of the bladder and of the urinary passages above was attributed to the use of **urotropin**.

¹ Wien. klin. Woch., 1900, No. 43.

³ Berlin. klin. Woch., July 2, 1900.

² Bolnit. Gaz. Botkina, Nos. 26 and 27.

⁴ Deut. med. Woch., Sept. 13, 1900.

P. J. Cammidge¹ records some experiments concerning **urotropin as a urinary antiseptic**. He found that urotropin does not seem to have any diuretic action, nor does it cause any notable change in the amounts of the ordinary chemie constituents of the urine. It was found in the urine within 10 minutes after taking 10 grains. Strong solutions of the blood, he found, would kill microorganisms, while weaker solutions had only an inhibitory effect upon their growth. The drug acts most markedly upon the typhoid bacillus, and much less decidedly upon the colon bacillus and the staphylococcus. This, he thinks, speaks against the view that urotropin is broken up and produces formaldehyd, since the latter substance, even in weak solutions, kills the colon bacillus readily. Prolonged heating will yield formaldehyd from urotropin, but this decomposition does not seem to occur at body temperature. The decomposition takes place particularly readily in the presence of dilute acids or acid salts, but even then does not seem to occur at body temperature. He considers, however, that acid reaction of the urine is an important factor in producing the antiseptic effect of urotropin, and he refers to the fact that the urine is usually acid in typhoid cystitis or typhoid bacilluria; he thinks that the action of the drug upon typhoid bacilli in the urine is largely due to this factor. He considers that its use for the purpose of disinfecting typhoidal urine is of value.

PARASITES.

D. Wallace,² in a brief article, reports 3 cases of **Bilharzia hæmatobia**, all of them in persons from South Africa. The patients were all about 21 years of age. They all exhibited hematuria, which in 1 case had persisted for 9 years. This patient stated that the passage of red urine was a very frequent thing among the boys at school in South Africa. The condition seemed to improve upon the use of salol.

S. P. James³ has studied the metamorphosis of **Filaria sanguinis hominis in mosquitos**, particularly in the *Anopheles Rossii* and other varieties of *Anopheles*. He kept the mosquitos alive for 2 weeks or more by confining them in a bottle containing a ripe banana during the day, and liberating them beneath a mosquito bar during the night. He followed the metamorphosis of the filaria to its final stage, the young filariæ being found in the tissues of the thorax, head, and neck, and to some extent in those of the abdomen. He practically always found them in the head and about the proboscis, and on two occasions he found the filariæ partly in the tissues of the head and partly in the tissues of the proboscis. He does not doubt that the young filariæ may be introduced into the human being by a mosquito bite. The filariæ readily move about in the tissues of the mosquito by boring their way; while in water their movements are limited, and they die in a few hours. He found that the filariæ died much sooner in water than in human blood, and he believes from this that they probably pass directly

¹ Lancet, Jan. 19, 1901.

² Scottish M. and S. Jour., Feb., 1901.

³ Brit. Med. Jour., Sept. 1, 1900.

from the mosquito to the human being without first existing in water. In discussion, Manson stated that the finding of filariæ in the proboscis of the mosquito is an indication, though not absolute proof, that the **mosquito may directly inoculate man**. The filariæ can live for a number of hours in water, and he thinks that it is possible that they live longer in dirty water than in clean, because they find more food in the former. That most Europeans escape infection is due, he thinks, to the fact that they are in better surroundings than the natives of the tropics, and they sleep under mosquito bars. If Europeans are bitten by filaria-bearing mosquitos, it is only relatively rarely, while natives are constantly bitten. J. Maitland¹ disbelieves in the theory of inoculation of human beings with filariæ from mosquito bites. He directs attention to the cases that are known of the occurrence of filariasis in servants while the masters escape, both living under the same circumstances. The effect of the mosquito bar he considers an insufficient explanation of such facts, because Europeans are constantly subjected to bites during the day. He thinks that the Europeans escape infection because they drink only boiled or filtered water, and believes that infection comes through water, giving a number of instances of infection which point toward this view.

B. Grassi and G. Noe² discuss the **method of infection with filaria** by means of the puncture of mosquitos. They consider that they have shown that when *Anopheles* bites, larvæ of filariæ are excluded from the labium, and thus the mosquito inoculates the subject of the bite. The method in which this occurs is described as follows: There are nine appendages constituting the mouth apparatus; six of these only are introduced. By two of these two canals are formed, one of them wider, and produced by the superposition of the labium upon the hypopharynx; the second is a groove along the hypopharynx itself. Gases are admitted along the wider canal from the sacs of the anterior intestine, and later the blood flows along this canal. The saliva is admitted along the lower and smaller canal. When the mosquito is penetrating the skin, the labium becomes bent toward the base at an obtuse angle. As the stylets penetrate, this angle advances to the middle of the labium and becomes much more acute, and at the time of complete penetration the labium appears doubled on itself so as to form a narrow loop, and at the same time through the closing of the neighboring parts together a new canal is formed. Grassi and Noe state that at the point when the labium becomes simply bent a rupture of the integuments occurs and the filariæ escape, and thus are discharged into the body of the host. Grassi and Noe state that they have found the rupture at the expected point in the labium. They believe also that the situation of the parts at this time is such as to direct the filaria toward the wound made in the subject of the bite. They have also found that *Anopheles*, after they had punctured an animal, seemed free of filariæ when they belonged to a brood that had been well infected previously.

¹ Brit. Med. Jour., Sept. 7, 1900.

² Brit. Med. Jour., Nov. 3, 1900.

W. T. Prout¹ observed a tumor about the size of a pigeon's egg in the buttock of a policeman in Sierra Leone, and excised it. The mass proved to be a cyst containing a collection of filariae in a semipurulent fluid. A similar mass was found in another man and also excised, and proved to contain numerous embryos of filariae and also two adult filariae, one a female and the other a male. Examination of the worms convinced Prout that they were specimens of **Filaria volvulus**.

Echinococcus.—Kokall² discusses the occurrence of the **echinococcus in Brünn** as indicated by the records in the hospital in that city. Between 1881 and 1895 there were 104,366 cases treated in the institution, and in 10 of these (0.009%) a diagnosis of echinococcus was reached. A much larger percentage was shown by the postmortem examination; 6943 autopsies were made in this time, and in 24 instances, or 0.34%, echinococcus was observed. In 9 instances it occurred in men, in 15 in women; 19 times it was found in the liver, twice in the lower lobe of the right lung, once in the spleen, once in the muscles of the lower extremities, and once beneath the diaphragm. The youngest patient showing echinococcus was 34, the oldest 84. Two cases were instances of *Echinococcus multilocularis*. During the same period **cysticercus** was observed 18 times (0.26%). In over 88% of the cases it was found in the brain or its membranes.

W. J. Buchanan³ notes the fact that the **natives of India** practically never show hydatid disease. The rarity of the condition leads him to report a case which occurred in a native of Bhagalpur, who had always lived in that region.

According to his experience, Devé⁴ concludes: (1) That hydatid cysts can develop from daughter cysts and scolices; (2) that cysts of the subperitoneal cellular tissue may give rise to various echinococcic germs (cyst-walls, daughter cysts, proligerous cysts, and scolices), which may thus get inside the peritoneal cavity. These facts indicate the necessity, in operative interference, of protecting the tissues from the vesicles and the practically invisible scolices. These germs should be destroyed before the cyst is opened by the injection of some teniacidal solution.

W. W. Kerr⁵ reports 2 cases of **trichinosis with eosinophilia**. In both cases there was severe muscular pain on using the muscles. In both cases there was digestive disturbance. In the first the tongue was very painful and was protruded with difficulty. In this case there were rose-colored spots on the abdomen, enlargement of the liver and of the spleen. There was an excess of indican in the urine in both cases, and the diazo reaction was present in both. Excised pieces of muscle showed trichinas. In the first case the eosinophilia varied in the 5 weeks through which counts were made from 31.1% to 68.7%. In the second case counts were made for a month, and the eosinophilia was found to vary from 18.1% to 86.6% ! Microscopic examination of

¹ Brit. Med. Jour., Jan. 26, 1901.

² Wien. klin. Woch., 1901, No. 4.

³ Lancet, July 7, 1900.

⁴ Gaz. Hebdom. de Méd. et de Chir., Feb. 7, 1901.

⁵ Phila. Med. Jour., Aug. 25, 1900.

the muscles showed no evidence of transition of polynuclears to eosinophiles. The counts of the blood showed a leukocytosis of about 25,000 in each case, the neutrophiles being subnormal in percentage; the small lymphocytes were also reduced, while the mononuclear cells were sometimes present in large numbers, but varied greatly, their number bearing no relation to the number of eosinophiles. There was, therefore, in the blood-counts, no testimony that the eosinophiles are derived from the large mononuclears. An excess of eosinophiles in the areas of cellular reaction about the parasite was believed to warrant the hypothesis that the eosinophiles were found in the affected tissues as a result of phagocytic efforts. But it is considered that the eosinophilia was due to systemic poisoning by toxins secreted by the parasite. In other words, that the eosinophiles are produced in the bone marrow and are merely attracted to these areas, and that they do not become eosinophiles as a result of phagocytosis, but that they are originally phagocytes which have a relation to this special form of toxin. Kerr thinks that the eosinophilia in these cases demonstrates nothing concerning the origin of the eosinophiles, so far as has as yet been studied. It is of value only as a diagnostic sign.

Gordinier,¹ after giving the history of the discovery of trichinosis, and mentioning Brown's work on the increase in eosinophilic cells in the blood in this disease, reports 2 cases of his own, in which the diagnosis was made by an **enormous eosinophilia**, 77% of eosinophiles in one case and 31% in the other. He calls attention to the fact that sporadic cases of trichinosis may pass for rheumatism, la grippe, or typhoid fever, but that a careful examination of the blood should establish the diagnosis of trichinosis.

F. A. Packard² accidentally found a specimen of **Tænia flavopunctata** in the small intestine in a woman who had died of sepsis from suppurating hydatid cyst. A segment had been passed during life. The parasite as found had a total length of 27 centimeters, was of a yellowish-white color, the head being black at the tip and flattened from side to side. The measurement of the head was 1 millimeter by 0.5 millimeter. The pigment was present in the shape of a four-leaf clover, a sucking disc being present in each division. The segments were from 1 to 3 millimeters in length. This is apparently the sixth case of infection of human beings with this parasite so far reported.

Dammer³ reports a case of **tetany** which occurred after successful **treatment of a tapeworm** with the extract of filix mas. The patient had no dilation of the stomach or other gastric disturbance, and Dammer thinks that the tetany was a toxic effect of the drug.

G. M. Giles,⁴ in opening a discussion on **ankylostomiasis**, stated that he considered the presence of the ankylostoma in the human intestine to be responsible for much sickness and a large number of deaths. The worm is frequently found in persons who are healthy, as well as in those who show signs of illness. The anemia produced is due to dam-

¹ Med. News, Dec. 22, 1900.

² Jour. Am. Med. Assoc., Dec. 15, 1900.

³ Münch. med. Woch., 1900, No. 46.

⁴ Brit. Med. Jour., Sept. 1, 1900.

age of the intestinal mucous membrane as well as to the loss of blood, and perhaps to an intoxication produced by the worm. He described a method which he uses to develop adult specimens of ankylostoma in the laboratory. C. F. Fearnside reported the results of his search for the ova of the ankylostoma in the stools of all the new arrivals in the Central prison at Rajahmundry. He found it in 68.1 % of 678 examined. Of 72 persons that showed the parasite, 13.9 % were in distinctly bad health, 16.6 % showed some symptoms, 70 % were in good health. In about 35 % of those who showed the presence of ankylostoma, *Ascaris lumbricoides* was present also. Two hundred convicts were examined after they had been in jail for over 6 months, and had consequently been under improved hygienic surroundings and had been given better food ; the ankylostoma was found in but 58 % of cases, while the ascaris was found in only 18.5 %. In 105 postmortem examinations the ankylostoma was found in 74.3 % ; 57.9 % of these showed local congestion of the bowel, and 11.4 % showed erosions or ulcers. He thinks that the effect of the ankylostoma is largely secondary, the symptoms being usually produced by concurrent disorders such as malaria and dysentery. The parasites in these conditions produce local congestion, erosions, and catarrh of the bowel, thus interfering with digestion, and retarding or preventing recovery. The loss of blood also has an unfavorable influence. The occurrence of the parasites in such large numbers as to cause true ankylostomiasis is uncommon. He does not think that ankylostomiasis can be considered to be present even when the parasites are found, unless other blood-destroying diseases are determined to be absent. Ankylostomiasis was defined by L. Rogers as an infection characterized by anemia, the anemia being caused by small losses of blood due to the presence for a long time of large numbers of ankylostomas, or of smaller numbers for a shorter time. If only a few worms, 15 or less, are present, ova are usually readily found, but if ova are found in practically every microscopic field, parasites are undoubtedly present in large numbers. If the person is in a condition to stand it, thymol should be used ; but if only a few ova are found, thymol should usually not be given, since it is likely to be more harmful than the presence of the parasites. In studying the blood conditions in ankylostomiasis, and in other conditions resembling it, Rogers found that in the apparently normal natives of Assam the hemoglobin is likely to be reduced to a little above 60 %, the red corpuscles running about 4,700,000, the leukocytes about normal. In epidemic malaria the hemoglobin is reduced to the neighborhood of 30 %, the red corpuscles to about 2,500,000, and the leukocytes to about 2500. In chronic malaria the red corpuscles were still further reduced, while the hemoglobin was about the same. In real ankylostomiasis the leukocytes were but slightly reduced, the red corpuscles were often down to about 1,000,000, and the hemoglobin to about 10 %. The characteristic of ankylostomiasis was that the hemoglobin was more reduced than the red corpuscles, the color index being about 0.31, or in the neighborhood of one-half the normal. The white corpuscles were

relatively much less reduced than the reds. The color index was found much higher in malaria, never being reduced to 0.5, while it was never found higher than 0.4 in ankylostomiasis; hence he concluded that in the treatment of ankylostomiasis iron is urgently indicated, while in malaria arsenic and bone marrow should be used. O. Baker, in continuing the discussion, stated his results from the examination of the prisoners in Moulmein jail, in Burma. The natives of Burma showed in 69 instances 55% of infection with ankylostoma. He believes that this parasite is directly or indirectly the cause of a marked mortality. **Infection comes chiefly through food.** Water is of little importance. P. Manson stated that thymol may be depended upon in the treatment of ankylostomiasis if it is given in sufficient doses. He recommends about 30 grains every hour for about 4 doses. The use of blood examinations for the diagnosis of malaria from ankylostomiasis he considers impracticable in ordinary instances.

DeLuna¹ describes a case in which **118 roundworms** were passed from the intestine, and in which there had never been any clinical symptoms causing any suspicion of the presence of parasites. He discusses the tolerance of the intestine toward parasites, and decides that the severe symptoms which are sometimes observed must be attributed to personal idiosyncrasy.

M. A. Ruffer² describes some intestinal lesions which were produced in his belief by **Oxyuris vermicularis**. The patient was an adult, who died from chronic cirrhosis of the liver and kidneys. The worms were found in large numbers in the intestine; in the rectum he found three small hard tumors the size of small nuts, and throughout the length of the large intestine **small elevations** varying in size up to the dimensions of a pea. There was no lesion of the mucous membrane over these nodules, and no signs of surrounding inflammation. Each nodule contained a calculeous mass which was easily shelled out; they lay between the submucosa and the muscularis, and were surrounded by a thick capsule of connective tissue. If a mineral acid was added to the calculus, gas evolved at once. Microscopic examination showed that an amorphous yellowish-brown substance composed the calculus, and that this was really deposited about the wall of a cyst which contained large numbers of eggs of the oxyuris. The oxyuris was believed to have penetrated into the walls of the intestine and to have laid its eggs there, some chronic inflammation ensuing and being followed by calcification. The female was not found, and was believed to have migrated back into the intestine or to have died and to have been absorbed.

Grunow³ reports the case of a man of 61 who was admitted to the hospital for advanced emphysema of the lungs, with bronchitis and severe arteriosclerosis. He had periodic attacks of diarrhea, which had occurred over an indefinite period. There was never mucus or blood in the stools, tenesmus was absent, but there was much gas, and the

¹ Gaz. degli Ospedali e delle Cliniche, 1900, No. 18.

² Brit. Med. Jour., Jan. 26, 1901.

³ Arch. f. exper. Pathol. u. Pharm., Bd. XLV, H. 3 u. 4.

abdomen was markedly distended. It was thought to be a case of catarrh of the small intestine. Examination of the stools showed the presence of **large numbers of curious bodies** which could be observed even during the periods when the patient was free from diarrhea, but were much more numerous during the attacks of diarrhea. The use of calomel made the patient worse; yeast caused some improvement. No active treatment could be undertaken because of the patient's bad general condition, and he soon died, with cerebral symptoms. The postmortem examination showed some enlargement of the mucous membrane of the small intestine, occasional ecchymoses, and a slight swelling of the follicles. The large intestine showed practically no change. The bodies found in the stools were present in the intestinal contents after death, and were also found in the wall of the intestine, chiefly, however, in the upper portions of the mucosa, only rarely in the depths of the mucosa; and while there was no absolute reason for thinking that they were pathogenic, it was observed that in places where they were present in large numbers there were usually changes in the intestine, which consisted chiefly in loss of epithelium of the mucosa, congestion, small hemorrhages, and infiltration with leukocytes. The bodies themselves were from 6 to 8 μ in diameter, sometimes as much as 13 μ . They showed a homogeneous inner body surrounded by a delicate capsule. The inner portion was round, or nearly so. A nucleus was usually visible, but was difficult to see; occasionally there were two nuclei. In some instances one could observe two bright points near the periphery diametrically opposite to each other, which looked like the polar bodies seen in karyokinesis. The parasites stained badly. Methylene-blue gave fair results, hematoxylin only unsatisfactory results; carbol fuchsin was more useful. There was no result from staining them with Lugol's solution. The bodies were thought to be probably coccidia, though this could not be determined definitely. It was considered that they conformed most closely to the characteristics of **Coccidium trigeminum**. They were looked for in a number of other patients and in sections from other intestines, but were not found.

PEDIATRICS.

BY LOUIS STARR, M.D., AND ALFRED HAND, JR., M.D.,
OF PHILADELPHIA.

MILK AND INFANT-FEEDING.

Infant-feeding easily takes first rank during the last year in the importance and number of contributions in pediatric literature, and it is fitting to consider first the paper read by Jacobi¹ at the Thirteenth International Medical Congress. He emphasized first the error of considering it possible to draw conclusions as to the physiology of the infant's stomach from chemie data, although much suggestive material has resulted from experimental and laboratory work. The subject is not solved by analyzing breast-milk and imitating its composition, for the composition of breast-milk varies from day to day and even during the same day, and often a child is found not thriving on the milk from one woman while that from another may be taken with benefit. After a **comparison of woman's and cows' milk**, and emphasizing the deficiency of the latter in sodium and the need for the addition of sodium chlorid, the author states that the only advance in infant-feeding for a number of years has been in the heating of the milk beforehand in order to destroy its bacterial contents. The dangers from dirty dairies have been recently learned, and these include not only germs of some of the specific infectious diseases, as scarlet fever, diphtheria, and typhoid fever, but also other nonspecific germs, which multiply rapidly in milk; and even if they are not pathogenic, the chemie changes they produce in milk may be such that the products may cause degeneration of the internal organs. The advantages and disadvantages of sterilization, tyndalization, and pasteurization are mentioned at length, sterilization at home being preferred, with care being taken to stir the milk constantly or else to remove the scum that forms, as this tends to protect the bacteria. The **relation of sterilized milk to scurvy** is not clear, the American Pediatric Society's investigation collecting 379 cases, of which 107 had been fed on sterilized milk, certainly not a large proportion. The best food for an infant is cows' milk modified, and Rotch deserves credit for having systematized a method by which this modification may be done and the food varied until that one is found which agrees with the child. The author prefers home modification to the preparation of the milk in a milk-laboratory, and separator milk and cream are not thought to be good. As to milk-sugar, that from cows'

¹ Arch. of Ped., Nov., 1900.

milk may not be the same as that in woman's milk, and the ordinary article of commerce is often impure, containing milk-bacteria, and its fermentation in the intestine may produce lactic acid and other products. When sugar is to be added, cane sugar is recommended as suitable, being beneficial in constipation. Fats and cereals are also useful additions to aid in the digestibility of casein and to improve nutrition. The old-time objection to the use of cereals was to their excessive or exclusive use, and, further, the belief that an infant could not, for some time after birth, digest any starch has been shown to be erroneous, as diastase is present in the parotid gland of newborn infants.

T. S. Westcott¹ contributes an extensive and careful paper on the **scientific modification of milk**, dealing particularly with percentage feeding and the calculation of percentage formulas. This part is an elaboration of his valuable work mentioned in the YEAR-BOOK for 1899, and it will be of interest to those who desire to follow out the reasoning by which the formulas are derived. In the general considerations of substitute feeding, mention is first made of the low amount of lactalbumin in cows' milk and the high proportion of caseinogen, and formulas are given later; caseinogen can, however, if digested, take the place of the lactalbumin in nourishing the child, but it is necessary very often to run close to the point of overtaking the digestive ability of the child in order to keep nutrition up. Thus the importance is seen of being able to gage the proportions of the different ingredients in a mixture for artificial feeding, as an increase of a few hundredths of 1% sometimes causes much disturbance. While it is safest and often necessary to give, when starting substitute feeding, low percentages especially of the proteids, and to keep them low for a time, yet they must be increased within certain limits as rapidly as possible, for satisfactory growth and nutrition cannot be expected so long as a child is on a lower percentage of proteid than 1.50. For the fat percentage, the author gives as a working rule that it should be 3% while the proteid is 1%, and should be gradually increased to 4% as the proteid is raised to 2%, which should not be reached before the fifth or sixth month. The need for partial predigestion is discussed, and the author has never observed any ill effects from the use of the procedure even when it has been necessary to continue it for several months. The practical application of percentage feeding receives consideration, 5 cases being detailed to illustrate the principles.

A. Monti,² in treating of the scientific basis upon which to construct a food equal to breast-milk, states that the problem of artificial infant-feeding will not be solved until it is possible to **imitate exactly the composition of breast-milk**. The most important points for imitation are the acidity and the proteids. He has found by experiments that 5 grams of sodium bicarbonate to each liter of cows' milk will make the reaction that of breast-milk (4 grams, if whey has been used for diluting). Diluting with whey brings up the proportion of lactalbumin and lessens

¹ Internat. Clinics, vol. III, tenth series, 1900.

² Arch. f. Kinderh., Bd. XXXI, H. 1 u. 2.

that of casein, rendering the latter more digestible; and although the proportions are not those of breast-milk, the results are far better than when water is used as a diluent. Although the fat-proportion when whey is used is lower than it should be, it is better not to add more fat, because centrifuging milk disturbs the emulsion and the fat cannot be easily admixed. The whey is a natural sugar of milk solution, and although it increases the salts, which are higher in cows' than in human milk, yet the above advantages outweigh this disadvantage. A whey mixture cannot, of course, be sterilized.

A. D. Blackader ¹ **prefers pasteurization of milk** at 140° to the sterilization at 212°, because the former will kill 99% of the bacteria and not change the composition of the milk.

T. M. Rotch ² discusses the **use of cereals to obtain finer curds**, and states that water or solutions of milk-sugar are as good diluents as gruels, and that the latter should not be used in the early months of life because of their adding a foreign element, starch, to the diet. The larger curds from cows' milk are due to the relative proportions of the caseinogen and the lactalbumin, and by the use of whey just as fine curds can be obtained as when gruels are the diluents, a further reason for considering the use of the latter irrational. With regard to the emulsion of the milk, it does not differ whether the mixture is made with plain water or barley-water, or whether centrifugal or gravity cream is used. When the emulsion is disturbed, it is from a combination of heat with the motion occurring in transportation.

L. E. Holt ³ also **disapproves of the use of cereals**. While the physician is to be guided by the proportions of breast-milk, yet no one formula can be made to do duty in all cases. The most frequent mistake is to start with too high percentages, but it is also just as undesirable to keep the proteid percentages low for a long time.

J. E. Winters ⁴ referred to the **good health of breast-fed infants** up to the time of weaning as contrasted with bottle-fed infants. When pure fresh milk can be obtained, he prefers not to use pasteurization.

H. D. Chapin ⁵ advocates the use of **gruels**, dextrinizing them if the starch causes indigestion. (See YEAR-BOOK for 1901, p. 285.)

R. G. Freeman ⁶ pointed out the **general need of pasteurization** because the ordinary milk in large cities is over 24 hours old and contains an excessive number of bacteria, some of which may be germs of tuberculosis, diphtheria, or other infectious diseases.

That the profession is alive to the importance of the subject of good milk for infant-feeding is shown by the continuance of the discussion of the subject. The success of the work done by the **Philadelphia Pediatric Society's Milk Commission**, as shown by its report,⁷ is evidently more than temporary. As a result of this, there is put into the Philadelphia market by several dairies a pure milk containing 4% fat, 3.5% proteid, uncolored and preserved only by cold, and containing not more than 10,000 germs to the cubic centimeter. The Commission

¹ Arch. of Ped., Jan., 1901.

⁵ *Ibid.*

⁶ *Ibid.*

² *Ibid.*

³ *Ibid.*

⁴ *Ibid.*

⁷ Phila. Med. Jour., Oct. 20, 1900.

appoints experts, a bacteriologist, a chemist, and a veterinarian, who make the examinations, without notice to the dairies, once a month. The fees for these examinations are paid by the producers, and the Commission then furnishes printed slips, to go with each bottle of milk, stating that the examinations showed the milk up to the required standard and that the next examination will be made within a month, when slips with a fresh date will be issued. These slips are placed on the pasteboard cap of the bottle, and over it is a tinfoil cap, according to the requirements of the Commission, the purpose of this being to keep the dust which may settle on it while standing at the door from being emptied into the milk as the pasteboard cap is being pried off. Similar work is being done in other cities, upon which report must be deferred until next year.

T. M. Rotch ¹ refers to the **dangers of milk when it is collected in the usual way**, and states that it is an ideal food when carefully produced and kept from contamination. The increased care of the cows, dairy, milk, and implements so increases the cost that such milk retails at 10 or 12 cents a quart, which price, strangely, the rich seem most unwilling to pay. The author gives the details of such care.

J. Noer ² holds that the percentages of the feeding are of less importance than the **purity of the milk**.

A. H. Whitridge ³ urges the training of medical students during the summer in the **proper way to modify milk** for infant-feeding and of the care necessary to obtain proper milk.

R. Jemma ⁴ showed by experiments that **milk from tuberculous animals is not necessarily rendered safe even by prolonged sterilization at 100° C.** Young rabbits were fed on sterilized milk to which were added cultures of tubercle bacilli that had been heated to 100° C. for 15 minutes. In a few weeks the animals died of marasmus, the autopsies showing mild enteritis and fatty degeneration of the liver. The control-animals thrived.

A. Volpe ⁵ conducted experiments with reference to the **comparative digestibility and nutritive value of raw and sterilized milk**. When raw milk is taken, not only the total S in the urine, but the ethereal sulphates are also increased, showing that the bacteria are not inhibited in their action. When sterilized milk is taken, the ethereal sulphates diminish, showing that the putrefaction is less, but the total S is also lessened, showing that some of the albumin ingested is not assimilated, and therefore general nutrition will be affected, while the undigested residue may become a source of harmful putrefaction.

F. M. Crandall ⁶ emphasizes the **importance of starting an infant right** when artificial feeding is necessary, using care not to give too strong a mixture, the percentages for the first 2 weeks not going above 2% fat, 6% sugar, and 0.6% proteid.

¹ Boston M. and S. Jour., vol. CXLIII, No. 3.

² Clin. Rev., vol. XIII, No. 4.

³ Maryland Med. Jour., No. 991.

⁴ Rev. Mens. des Mal. de l'Enf., vol. XVIII, No. 11.

⁵ Il Policlinico, Apr. 1, 1900; Arch. of Ped., Mar., 1901.

⁶ Internat. Med. Mag., vol. X, No. 2.

W. P. Northrup ¹ strongly recommends the use of the laboratory and clean cows' milk in artificial feeding.

E. H. Bartley ² points out that one reason why intestinal disturbances are brought about easier in bottle-fed than in breast-fed infants is that the **nuclei of cows' milk contain more phosphorus than human milk**, and the stools of bottle-fed infants show more organic phosphorus. To bring up the proteid percentage of milk mixtures, he advocates the addition of white of egg. Pasteurization is preferred to sterilization, and home modification is considered as successful as laboratory feeding. As a home method he suggests siphoning off the lower milk from a bottle, adding essence of pepsin to the siphoned part, heating it gradually to 155° F., straining, adding milk-sugar and white of egg to the whey, which is then mixed with the cream and top milk.

J. Pechtl ³ decries the addition of milk-sugar to cows' milk for infant-feeding, having seen a number of infants, fat, pale, anemic, and flabby, with acid eructations and belchings, improve greatly when the milk-sugar was stopped. The author's theory is that the casein in cows' milk is in combination with a phosphate of lime, and that lactic acid, which is easily formed by the fermentation of milk-sugar, precipitates the lime salts, thus coagulating the casein and rendering it difficult of digestion.

G. F. Still ⁴ discusses the **proportion of fat necessary** in an infant's diet, and states that at least 3% should be present, while some children need 4% or even 5%. A fall below 2% during the first year will soon be followed by some disturbance of nutrition, failure to gain in weight, constipation, or even rickets.

P. Nobécourt and P. Merklen ⁵ refer to the reports of Beecham and of Marfan on **certain ferments, galactozymase, and lipase present in human milk**, and report the results of their observations on the action of milk on salol with the production of salicylic and carbonic acids. Woman's milk was found to possess this property to a decided extent, the action of cold checking it and pasteurization or sterilization destroying it. Milk from asses had a similar action, an interesting point in view of the fact that this milk ranks next to human milk in desirability as an infant food. Milk from cows, dogs, and goats did not contain such a ferment to any extent.

R. Jemma ⁶ reports an **unusually high percentage of fat (6%)** in breast-milk, the excess producing intestinal disturbances in the nursing. Sterilized skim milk was given alternately with the breast, and the digestive disturbance ceased.

F. W. Tunnicliffe and O. Rosenheim ⁷ investigated the influence of **plasmon** (a dried milk proteid) on the nutritive values of various foods and found that it increased them decidedly, and when added to milk did

¹ Jour. Am. Med. Assoc., vol. XXV, No. 4.

² Brooklyn Med. Jour., vol. XIV, No. 5.

³ Jahrb. f. Kinderh., 1901, Bd. CXI, S. 216.

⁵ Rev. Mens. des Mal. de l'Enf., Mar., 1901.

⁶ Gaz. degli Ospedali e delle Cliniche, Nov. 4, 1900.

⁷ Brit. Med. Jour., No. 2076, 1900.

⁴ Practitioner, No. 384.

not increase the bulk nor interfere with the digestibility, while the proteid content could be raised to any figure desired. In studying the effect of diet on 3 children between 3 and 6 years of age, a greater increase of weight was found to occur during the milk-proteid period than during the meat period, and they therefore conclude that plasmon is capable of replacing meat in the mixed diet of children.

G. T. Palmer¹ does not favor the use of **sterilized milk for infant-feeding** even among the poor, and he describes the method of the Trinity Diet Kitchen, Chicago, where certified dairy milk is modified and delivered in sterile jars packed in ice. Attendants visit the children daily to see that the directions are carried out. Out of 700 infants supplied with such milk only 3 died. [The plan is certainly commendable.]

Whey, formerly much used in certain conditions of feeding, has not been mentioned in writings to any great extent until recently. Monti² and Westcott³ point out its value in making a cows' milk mixture with the different proteids in a proportion approximating that of human milk.

Westcott,⁴ in a paper read in October, 1900, presents formulas by which advantage may be taken of this use for whey in home modification, using **cream** and **whole or skim milk** in combination with **whey**.

F. W. White and M. Ladd⁵ analyzed 6 samples of whey and found the total proteids to amount practically to 1%, a somewhat higher figure than Koenig's (0.86%), used by Westcott. In order to prevent the rennet used in making the whey from curdling the cream of the mixture, the whey should be heated to 65° C., a higher temperature involving risk of coagulating some of the proteids. It was found that **whey-cream mixtures** could be made having a maximum whey-proteid value of 0.90% and a minimum of 0.25%, the caseinogen ranging from 0.25% to 1%, the fat from 2% to 4%, and the milk-sugar from 4% to 7%. The coagulum yielded by a whey-cream mixture was much finer, less bulky, and more digestible than that from a plain modified mixture with the same total proteids, the coagulum of the former being equaled only by that of barley-water mixtures. No difference was observed in the coagulum between gravity and centrifugal cream mixtures.

A. B. Marfan⁶ gives a systematic study of **overfeeding with milk and premature weaning** as a cause of digestive disorders in infants. He first discusses the overfeeding which may occur in breast-fed infants and may result in various forms of indigestion. This arises in one of three ways: either through too frequent nursings, or because of too great a secretion, or because the milk is too rich in one or more of its ingredients. The first is the most common cause and is easily corrected; the second may escape notice for a time, but may be remedied by shortening the nursing-period and emptying the breast subsequently with a breast-pump; the third is not frequent, and can only be proved by chemie

¹ Phila. Med. Jour., Feb. 2, 1901.

² Am. Jour. Med. Sci., Oct., 1901.

³ Arch. de Méd. des Enf., July, 1900.

⁴ *W. supra.*

⁵ Phila. Med. Jour., Feb. 2, 1901.

⁶ *Loc. cit.*

examination of the milk. The richness may be in any one of the ingredients, the one most frequently fluctuating being the fat, which, in some cases, has been found to be 8 %. When the fat is normal and digestion is disturbed, the author thinks that it may possibly be due to a minute division of the fat-globules. In other cases the casein or other proteids, the salts, especially the chlorids, or even the lactose, may be in excess. Overfeeding in bottle-fed children may be due to the use of undiluted milk, to too frequent nursings (cows' milk being more slowly digested than human), or to too large amounts. The use of goats' milk is also often attended by indigestion dependent upon overfeeding, because of the high proportions of fat and casein. The effects of overfeeding are manifested mainly in two ways—overnutrition and malnutrition, the former being characterized by obesity, flabbiness, eczema, and soft stools, which the author terms "fat-cachexia." In the latter, the digestive troubles protect the child from overnutrition, but prevent proper absorption, with the result that the child emaciates. After a consideration of the pathogenesis of overfeeding, in which hyperpepsia followed by lessening of the gastric digestion, stasis of the chyme, intestinal fermentation with the formation from lactose of lactic and other fatty acids all take part, the author mentions premature weaning as liable to bring about digestive troubles because of the use of cereals and meat at too early a time. He states that, even if Heubner and Carstens have found amylolytic ferments in early infancy, nevertheless the use of the farinaceæ is clinically attended with intestinal fermentation which may engender serious consequences. Broths should not be given before the fifteenth month and meat before the twentieth, as these set up a putrid fermentation.

A. Schlossmann¹ treats of the breast-feeding of infants and gives some observations and the results of his examinations. He mentions the difficulty of expressing or pumping from the breast of a woman a milk exactly like that which is secreted during the act of nursing a child. The report on the examinations is extensive, covering 80 pages.

F. Valagussa and C. Ortona,² working under Concetti's direction, have made a valuable study of the persistence and pathogenic power of certain **bacteria in milk**. The germs of tuberculosis, typhoid, and diphtheria, staphylococci, *Bacillus proteus*, *Bacillus mesentericus vulgaris*, *Bacterium coli*, *penicillium glaucum*, and *mucor mucedo* were used and it was found that low temperatures checked the growth and that sterilization could only be obtained at high temperatures, 100° for the nonspore-forming germs, 120° for the spore-formers; 80° was found of no effect on the tubercle bacillus; the addition of lactose aided the death of the germs. Germs introduced into milk collected aseptically lived longer than those in sterilized milk, showing that the heat must alter the nutritive properties of milk.

J. J. Repp³ discusses systematically the transmission of tubercu-

¹ Arch. f. Kinderh., Bd. xxx.

² Ann. de Igïe. sperim., 1900; Arch. de Méd. des Enf., Mar., 1901.

³ Phila. Med. Jour., Aug. 11, 1900.

losis through the meat- and milk-supply, claiming that the meat and milk from tuberculous animals may contain living virulent tubercle bacilli pathogenic to human beings, and that therefore, in regard to milk, if the udder is tuberculous, the milk should not be used unless well sterilized, and that even if the udder is healthy and the cow is tuberculous, the milk may sometimes be dangerous and should therefore either not be used or used only after sterilization.

G. M. Kober¹ has collected important testimony as to the frequency with which **milk may be the carrier of infection**, having tabulated 195 epidemics of typhoid fever, in 148 of which the disease existed at the farm or dairy; 99 outbreaks of scarlet fever, in 68 of which the disease was present in the farm or dairy; and 36 epidemics of diphtheria, in 13 of which the disease existed at the farm or dairy. The author believes in rigid inspection, and urges that, in addition to legislation, there should be education of the public on the subject.

D. H. Bergey² examined milk from a good dairy, the use of which had been followed by intestinal disturbance in an infant, and found **streptococci** in great numbers. Literature on the significance of these germs in milk being very scanty, he investigated 40 samples of ordinary market milk, finding streptococci present in 50%, while in 16 samples from one of the best dairies supplying Philadelphia, only 6.25% contained the germs. Of 7 samples from another dairy, 28.5% had streptococci, and of 8 samples from another, none contained the germ. The importance of careful veterinary inspection and of cleanliness in collecting the milk is emphasized.

F. D. Harris,³ led by the fact that of the **infants dying from diarrhea** in St. Helen's 81% were bottle-fed, instituted a supply of sterilized humanized milk with the result that of the 24 deaths among 332 children in 1 year, only 4 were from diarrhea.

E. Schlesinger⁴ points out that by **diluting cows' milk**, less nourishment in an equal bulk and more water are introduced. The latter may interfere with digestion and may burden the economy so that in some cases the use of undiluted milk may be of great advantage, as shown by Wasserman.

J. P. C. Griffith,⁵ in advocating the use of milk-laboratories and **prescribing in percentages**, refers to the accuracy of the method and the greater ease with which corrections and changes in the diet can be decided upon and made when necessary, than when the mixtures are made at home and calculated on the basis of so much milk, cream, etc.

Saxhlet⁶ points out that the old practice of adding a pinch of **salt** to each bottle of **milk** is entirely **reasonable**, because, although cows' milk has twice as much sodium chlorid as human milk, yet the increased demand for HCl in the digestion of the cows' milk renders this practically too poor in salt. He refers to sterilization as having been blamed for the development of scurvy, and claims that sterilization renders milk easier

¹ Am. Jour. Med. Sci., May, 1901.

³ Brit. Med. Jour., Aug. 18, 1900.

⁵ Phila. Med. Jour., Mar. 16, 1901.

² Am. Med., Apr. 20, 1901.

⁴ Berlin. klin. Woch., Feb. 18, 1901.

⁶ Münch. med. Woch., Dec. 4, 1900.

of digestion and capable of curing scurvy and rachitis. He recommends the preparation of the milk-bottles at home, with sterilization.

Friedjung¹ investigated the **iron present in human milk** and its importance for the nursing infant, and found that it is in direct relation with the casein present, the normal average of the iron being 5.09 milligrams per liter. Any lessening in this amount is followed by chronic disturbances of nutrition in the infant.

INFECTIOUS DISEASES.

Diphtheria.—W. T. Councilman, F. B. Mallory, and R. M. Pearce² have issued a monograph on **diphtheria** based on a study of the **bacteriology and pathology** of 220 fatal cases. In the introduction, reference is made to the enormous literature on the subject, the disease being the best known of any of the infections. The authors do not claim that their work has added much to the general knowledge, their results being mainly confirmatory of other investigators. [The fact that it will therefore be in the nature of a rounding up of the pathology to date leads us to give space to their conclusions.] Of the cases, 161 were of pure diphtheria and 59 were mixed infections, 34 being with scarlet fever, 16 with measles, and 9 with both, there being no main difference between the findings in either group. Tuberculosis was found in 16% of all the cases, evidently entirely independent of the diphtheria. Among the unusual associations were 1 case with puerperal sepsis, 1 with erysipelas, 1 in the course of epidemic cerebrospinal meningitis, 3 with typhoid fever, and 1 with tuberculosis and amebic dysentery. Group I, pure diphtheria, and group II, the mixed infections, were found on bacteriologic examinations to show about an equal number of general infections with the diphtheria bacillus, group II, however, giving a larger number of general infections with *Streptococcus pyogenes*, as would be expected with the large number of cases of scarlet fever. Details are given of the results of cultures of the different organs, the report on each organ being headed with a summary of the literature. Two items are worthy of note here; one, that the lung is often invaded by the bacillus without any clinical signs, and the other, that the accessory sinuses of the nose may be involved in the disease and may furnish an explanation of the persistence of the bacilli, for a long time after recovery, in cultures from the throat or nose. The reports on the histologic examinations of the different organs are exhaustive, without unnecessary details. In a study of the membrane, the bacilli were never found growing in the living tissue, but always in necrotic tissue and usually in masses. They probably grow first in the fluids of the mouth, the toxin produced causing a necrosis which then forms a suitable culture medium, this first step in the process of membrane-formation being then followed by an exudation rich in fibrin factors. The fibrin, in part, is formed into a reticulum around exudation cells and degenerated epithelium; in part it combines with the hyaline degenerated cells to form a

¹ La Semaine Méd., May 1, 1901.

² 688 Boylston Street, Boston, Mass., 1901.

hyaline membrane, the latter being most often formed on surfaces having several layers of epithelial cells. There is nothing specific in the membrane-formation and there is no advantage in making a distinction between croupous and diphtheric membrane. The membrane-formation is accompanied by changes in the underlying tissue which represent a combination of degeneration and exudation. While there is nothing characteristic in the **changes in the myocardium**, degeneration of the muscle is one of the most common conditions found in diphtheria, a majority of all the cases showing a fatty degeneration of varying degree and extent preceding, in some cases, more advanced forms of degeneration in which the muscle is completely destroyed. Interstitial changes of two kinds are found—focal collections of plasma and lymphoid cells and a proliferation of the cells of the tissue secondary to the degeneration of the muscle; the latter may result in fibroid myocarditis. **Changes in the lungs** are almost always present and often are so serious as to indicate that death resulted from them rather than from the diphtheria itself. As all these cases had been treated with antitoxin, it was thought that those in which no lung-lesion occurred recovered, and those in which the lung-infections developed, which are due to pneumococci or streptococci, and which are uninfluenced by the antitoxin, died. The main lesion is bronchopneumonia which has its start in the atriums extending to the air-vesicles and to the small bronchi. When only scattered acini are affected, the authors prefer the term acinous pneumonia. The capillaries were often seen to contain large bodies which were probably degenerated marrow cells and which may have been formerly mistaken for hyaline degeneration. Dilation of the lymphatics is very common. The histologic examination, contrary to the results of culture, indicate that the chief lung infection is by the pneumococcus. The only **changes of importance in the spleen** are hyaline degeneration of the arteries and foci of epithelioid cells in the lymph-nodules, these cells being phagocytic, the detritus which they contain coming from the lymphoid cells. The changes in the intestines are unimportant and are probably the result of the toxin brought by the blood rather than absorbed from the canal. The **lesions in the liver** do not differ from those in other infectious diseases, comprising a general degeneration of the liver-cells and a focal necrosis which is usually in the centers of the lobules. These are the result of the toxin and not of any direct action of the bacilli. Much the same may be said of the kidney-changes, the appearances being similar to those in other infections and due to the toxin. The **lymph-nodes** show important changes of two kinds; the first are those ordinarily present in many conditions, and comprise congestion, hemorrhage, and diffuse and circumscribed necrosis, with the appearance of new cells, some of which are derived from the lymphoid cells and others from a proliferation of the endothelial cells of the sinuses and reticulum; the second are said to be distinctive of diphtheria although present in other infectious diseases, and consist of foci similar in appearance to miliary tubercles, and comprising a combination of proliferation, phagocytosis, and degeneration; the first process results in the formation

of epithelioid cells having phagocytic properties, which consume the detritus of the lymphoid cells and themselves degenerate subsequently. The **thymus** was examined in 20 cases, the principal change being degeneration of the lymphoid cells. This, as observed by Flexner, was in the neighborhood of the Hassel bodies. Eosinophile cells were numerous and hyaline degeneration of the walls of the vessels was found. Studies of the **nervous system** showed that in certain cases there is a slight to marked diffuse fatty degeneration of the nerve-fibers of the central nervous system and of its peripheral extensions. In such cases there is also probably an involvement of the skeletal muscles as well as of the myocardium. The **bone-marrow** was examined in 48 cases, but no definite conclusions could be formulated with reference to the changes observed, beyond a lymphoid condition. Negative results were obtained from examination of the pancreas, adrenals, thyroid, salivary glands, testicles, and pituitary body. Appended to the monograph are a very important bibliography and 14 plates of illustrations, comprising many admirably executed reproductions of photomicrographs.

R. G. Ferrer ¹ reports 2 cases of **postdiphtheric paralysis treated successfully** with frequently repeated doses of **antitoxin**, which would indicate that some cases are due to the direct action of the bacilli on the nerve centers.

L. Cobbett ² obtained the diphtheria bacillus from the **nasal discharge of a pony** belonging to a little girl who contracted diphtheria. The author is of the opinion that the horse may be responsible in some instances for the spread of the disease, a confirmatory point being the presence of a certain amount of diphtheria antitoxin in the blood of horses that are apparently normal and have not been used for the manufacture of antitoxin. These horses may have had diphtheria.

F. P. Denny ³ investigated the frequency of **diphtheria bacilli in the noses and throats of healthy individuals** and found that the bacilli are rarely present in healthy throats of those who have not been exposed to diphtheria; that the healthy people in whose throats the germs were present were those who had been exposed and who lived under bad hygienic conditions or in institutions, the unfavorable condition in the latter being the housing of a large number of people in a limited air-space; that healthy people with virulent bacilli in their throats can spread the disease, and that therefore cultures should be taken from the throats of healthy people in attendance on or having been exposed to diphtheria.

Eschweiler ⁴ thinks that many cases of **nasal diphtheria** may not be primary, but are, rather, secondary to a deposit in the nasopharynx, the discharges working forward and infecting the nasal passages. He reports such a case and urges treatment of the nasopharynx after every case of diphtheria, especially when adenoids are present.

H. B. Donkin ⁵ gives some good ideas with reference to the interpre-

¹ Arch. of Ped., June, 1901.

² Lancet, Aug. 25, 1900.

³ Boston M. and S. Jour., Nov. 22, 1900.

⁴ Münch. med. Woch., Apr. 17, 1900.

⁵ Brit. Med. Jour., Nov. 3, 1900.

tation of the symptoms and bacteriologic report for the diagnosis of diphtheria. He thinks that all cases should be treated as diphtheria without waiting for the bacteriologic report, in which the symptoms would have raised little or no doubt before the discovery of the bacillus; those cases, also, should be treated as diphtheria which lack the usual clinical signs, but are associated with bacilli found to be virulent to animals; that no attention need be paid to a positive bacteriologic report when the person is healthy and the bacilli have no virulence [not safe], or to a negative report when the clinical signs are clearly those of diphtheria.

L. M. Spolverini¹ shows that the **death-rate** from diphtheria in Rome **before the introduction of the antitoxin** was from 60% to 70%, and that the **antitoxin reduced** it to about 16%, at which figure it remained for 4 years, from 1895 to 1899. In the following year it **suddenly rose to 28%**, with a great increase in the number of cases. The author explains this rise by stating that a widespread epidemic of measles with a high mortality had preceded the diphtheria and had predisposed to it; that an unusual percentage of the cases were laryngeal, and many cases were of mixed infection; that bronchopneumonia was a common and fatal complication; and, finally, that in many cases the administration of antitoxin was deferred too long.

W. Ewart² treats his cases of diphtheria locally by dropping **carbolized oil** into the nostrils while the head is held back, his aim being to promote comfort and to lessen the period of infectivity.

H. Friedenwald³ observed a case of **diphtheria** in a girl 6 years old, followed 1 month later by **convergent strabismus**, both external recti being completely paralyzed. Although this distribution of post-diphtheric paralysis would seem rare, the author refers to a series of 150 cases collected by Moll in 1896.

F. Lobligois⁴ examined the **urines** from 118 cases of **diphtheria** for **Ehrlich's diazo reaction** and found it positive in but 5, and in 4 of these there was an explanation other than the diphtheria.

B. E. Myers⁵ analyzes the records of **1316 cases** of diphtheria with special reference to the development of paralysis, which occurred in 1 out of every 5 cases.

F. G. Burrows⁶ analyzes the records of **2093 cases** of diphtheria seen in the Boston City Hospital.

McCullom⁷ reports on the use of **repeated doses of antitoxin**, 4000 units being given every 4 hours until improvement is shown. Some cases received from 80,000 to 100,000 units, and many patients were saved that would have died otherwise. The mortality-rate was lowered and there were no harmful effects.

C. Mongour⁸ urges the use of **antitoxin in the treatment of postdiphtheric paralysis** and before its development, if the general state is not satisfactory after the disappearance of the false membrane.

¹ Il Policlinico, Dec. 1, 1900.

² Edin. Med. Jour., Sept., 1900.

³ Phila. Med. Jour., vol. VI, No. 1.

⁴ Rev. Mens. des Mal. de l'Enf., June, 1901.

⁵ Lancet, Sept. 22, 1900.

⁶ Am. Jour. Med. Sci., Feb., 1901.

⁷ Arch. of Ped., Dec., 1900, p. 932.

⁸ Jour. de Méd. de Bordeaux, Apr. 15, 1900; Arch. de Méd. des Enf., Jan., 1901.

A. Zamboni ¹ reports 2 serious cases of croup cured by **intravenous injections** of the antitoxic serum.

M. Manges ² refers to the case with which **diphtheria in typhoid fever** may be overlooked owing to the stupid state of the patient. He refers to the scanty literature on the subject and mentions the grave prognosis. He reports 6 cases, all being treated with antitoxin and only 1 patient dying.

Measles.—J. J. Cotter ³ reports an epidemic of 187 cases observed in the New York Foundling Hospital, with special **reference to Koplik's spots**. Eight cases were absolutely negative, 10 were doubtful, the remaining 169 being positive. Fever, eruption, and the buccal spots were present on the first observation contemporaneously, in 78 cases; in 2 cases the buccal spots followed the eruption by 1 day, in 1 case there was no eruption, and in all the others the buccal spots preceded the eruption by from 1 to 5 days, fever always accompanying them. The spots did not furnish help in preventing the spread of the disease, but their value from a diagnostic standpoint is emphasized. C. C. Ross, ⁴ from a study of 15 cases, reaches similar conclusions as to its value for diagnosis and differentiation. J. L. Hirsh ⁵ reviews the literature and states that in about 50 cases under his observation the spots were present in every one. Widowiec ⁶ found Koplik's spots present in 140 out of 158 cases of measles, and therefore claims that they are not absolutely diagnostic, as they are absent in 10%, and he further found them present in 10 cases of rōtheln, one of follicular tonsillitis and one of laryngitis. Rolly ⁷ has been unable to find them in a great variety of diseases, and missed them in only 11 cases of measles, some of which were examined late, and he therefore attaches great value to them in the diagnosis.

In an analysis of 327 cases of measles, Sepet ⁸ found that when the **period of incubation** could be definitely fixed it was never less than 9 nor more than 12 days, and that there was no relation between the length of this period and the severity of the disease. While the disease is contagious during all of its evolution, it is more so during the initial catarrhal stage, the contagion ceasing with the end of desquamation. A preeruptive scarlatiniform erythema was present on the first and second days of the invasion in 5 cases. A purpuric eruption came out in 1 case on the second day, and was followed by hemorrhagic measles and death. **Koplik's sign was present** in almost all the cases [the exact figures not being given]. Out of the 9 adults affected, 4 presented a pimply eruption, which was, however, easily distinguished from variola. This occurred in the confluent form of the eruption, and those cases were very severe. The fall of temperature began on the second day of the eruption, and the normal was reached by the seventh.

¹ Gaz. degli Ospedali e delle Cliniche, Apr., 1900; Arch. de Méd. des Enf., Jan., 1901.

² Am. Med., June 1, 1901.

³ Arch. of Ped., Dec., 1900.

⁴ Columbus Med. Jour., vol. XXIV, No. 2; Arch. of Ped., Aug., 1900.

⁵ Phila. Med. Jour., Aug. 25, 1900.

⁶ Wien. klin. Woch., 1899, No. 37; Rev. Mens. des Mal. de l'Enf., July, 1900.

⁷ Münch. med. Woch., 1899, No. 38; Rev. Mens. des Mal. de l'Enf., July, 1900.

⁸ Méd. Mod., 1899, No. 76; Rev. Mens. des Mal. de l'Enf., July, 1900.

Desquamation was very light except in 1 case, in which it occurred in large flakes. Recurrence—that is, “reappearance of the disease produced by the same germ, which has not spent all of its virulence”—was seen once, the fever returning on the fifteenth day, 5 days after the temperature had fallen to normal, with the eruption on the fourth day of the recurrence. The author does not believe in the occurrence of true relapses, holding that one attack of measles confers an immunity which does not lessen with time. In but 2 cases was there a history of a previous attack diagnosed by a competent physician. Complications on the part of the buccal cavity, stomatitis, and noma were entirely prevented by thorough antisepsis. Out of the first 180 cases, during January and February, only 2 patients died, 1 from meningitis and 1 from pneumonia. During March and April there was an epidemic of grip running along with the measles, the latter at once becoming more severe with a mortality of 24 out of the 157 cases. In this second group the respiratory complications were frequent, and it was noticed that all of 7 cases that developed bronchopneumonia before the eruption ended fatally. Tuberculous meningitis occurred in 1 case, and acute nephritis was seen in 2 bronchopneumonic cases. There were no ocular complications, and but 4 cases of otitis. Noma pudendi occurred once. The alimentary tract was not disturbed by the measles in any case, but there were a number of cutaneous manifestations, including abscesses, boils, and impetiginous eruptions.

E. M. Dupaquier¹ analyzes 128 cases of measles, of which 5 were well-authenticated **instances of second attacks**.

Among the most recent therapeutic measures is the **treatment of measles with red light**, as suggested by Chatinière,² who has treated 22 cases simply by hanging red curtains over the windows and other sources of light of the room, exposing the child as much as possible to these rays. He has found the disease to run an exceptionally mild course with rapid defervescence, fading of the rash, and absence of complications. He thinks that failures with the method are due to its improper application, as the child should not be screened from the light. Guinon, Comby, and Saint-Philippe, on brief trial, were unable to find any benefit from the method. [Before passing judgment on this, the profession at large will undoubtedly test it in a large number of cases and settle its true value.]

For the **control of epidemics** of measles or scarlet fever, J. Elgart³ reports success with the use of antiseptic inhalations, starting with the idea that the primary disease is in the upper respiratory passages. Different solutions were used: boric acid (3%) in lime-water, 0.05% iodine trichlorate, and 3% sodium chlorate.

P. W. Williams⁴ discusses the **value of Koplik's spots** in the early diagnosis of measles, and concludes that while their absence does not exclude measles, their presence makes a positive diagnosis.

¹ New Orl. M. and S. Jour., vol. LIII, No. 1; Arch. of Ped., Dec., 1900.

² La Presse Méd., Sept. 10, 1898, and Apr. 28, 1900; Arch. de Méd. des Enf., Sept., 1900; Rev. Mens. des Mal. de l'Enf., Oct., 1900.

³ Wien. klin. Woch., Sept. 20, 1900.

⁴ Bristol Med.-Chir. Jour., vol. XVIII, No. 68.

L. Guinon¹ discusses the value of the **premonitory signs of measles**, pointing out the impracticability of Meunier's prodromal loss of weight and Combe's hyperleukocytosis. He refers to Comby's sign of an erythematopultaceous stomatitis as having received less attention than Koplik's sign, "evidently because it [the latter] is not of French origin," but his own opinion is that Comby's is of much greater value, although he has found it present in grip and in a morbilliform erythema after diphtheria antitoxin.

H. A. West² reports an attack of measles in a girl of 11 years, followed in 4 days by high fever, somnolence deepening to coma, strabismus, constipation, and albuminuria. Consciousness returned gradually, but a **motor paralysis** of the legs persisted for 10 days. The author believes the case to have been one of meningitis, probably grip-pal, as the mother had influenza while nursing the child.

A. Baginsky³ reports a case of **measles** in an infant 11 months old, **with a bullous eruption** the fluid from which gave a diplococcus in pure culture. The heart blood was sterile, but there was a purulent inflammation of the pleura and pericardium. In a second case a vesicular eruption preceded that of the measles, cultures at the autopsy showing a general infection with *Streptococcus pyogenes*; tuberculosis was also present.

O. Lerch⁴ reports the **coexistence** in a boy 12 years old, of **measles and chickenpox** [*v.* YEAR-BOOK for 1897, p. 754], and in a man 28 years old, of measles and smallpox.

Typhoid Fever.—G. Blumer⁵ reports what seems to be an undoubted case of **congenital typhoid fever**. The child was born 4½ months after the mother had recovered from typhoid, and died on the ninth day, having had hemorrhages from the gums and vagina, petechial eruption in the skin, convulsions, and slight fever. At the autopsy, in addition to cloudy swelling of the organs, phagocytic epithelioid cells were seen in the heart, lungs, liver, kidneys, adrenals, pancreas, and uterus. The typhoid bacillus was recovered from the lung, spleen, umbilical cord, bile, and large intestine. Alimentary infection was excluded because the child was breast-fed. An excoriation at the base of the umbilical cord was not considered possible as the portal of infection and the mother's urine contained no typhoid bacilli, so the author considers the case to be unique in the time during which the bacilli remained latent in the fetal tissues, the hemorrhagic features being a natural tendency in cases of this class. [It might be added that alimentary infection by means of drinking-water, if such were given, is a possibility in the case, although the necessarily extremely short period of incubation would negative this theory.]

J. L. Morse⁶ gives a thorough review of the literature on **fetal and infantile typhoid**. With regard to fetal typhoid his conclusions

¹ Rev. Mens. des Mal. de l'Enf., Apr., 1901.

² Ann. of Gynec. and Ped., vol. XIII, No. 9.

³ Trans. sixteenth meeting Gesell. f. Kinderh.; Arch. of Ped., May, 1901.

⁴ New Orl. M. and S. Jour., vol. LIII, No. 2.

⁵ Jour. Am. Med. Assoc., vol. XXXV, No. 26.

⁶ Arch. of Ped., Dec., 1900.

are: (1) The typhoid bacillus can traverse the abnormal, and possibly the normal, placenta from mother to fetus. Other organisms may also pass in the same way. (2) Infection of the fetus results. Because of the direct entrance of the bacilli into the circulation, intrauterine typhoid is from the first a general septicemia. For this reason, and possibly also because the intestines are not functioning, the classical lesions of intrauterine typhoid are wanting. (3) The fetus usually dies *in utero* or at birth as the result of the typhoid infection. (4) It may be born alive, but feeble and suffering from the infection. If so, death occurs in a few days without definite symptoms. (5) It is possible that the fetus may pass through the infection *in utero* and be born alive and well. There is, however, no proof that this happens. (6) Infection does not always occur. The pregnant woman does not necessarily transmit the disease to her child. He agrees with the general consensus of opinion that "except for the lessened exposure of the first year through food there seems no obvious reason why typhoid should be less frequent in infancy than in later life." The small number of cases reported may depend really on an infrequency of the disease or because many cases are unrecognized. To clear up this point, bacteriologic examinations in autopsies on infants and the Widal test in cases of sickness will be of great aid. With regard to the serum reaction, he states that it occurs in infantile as in adult typhoid, adding in a later contribution¹ that there is some evidence that it appears earlier, is feebler, and disappears sooner in children. Doubtful value is to be attached to a positive reaction in a nursing infant whose mother has or has had typhoid fever, for, in spite of a certain filtering power resident in the placenta, in the mammary gland, and in the infant's digestive tract, the agglutinative principle may be transmitted from the mother. In a doubtful case, testing the mother's blood and milk and stopping breast feeding would be of help in determining a possible typhoid infection in the child.

A. Samuels² reports **typhoid fever in a breast-fed infant** 18 months old, the infection having arisen through unboiled drinking-water. Constipation, enlargement of the spleen, high fever, which ended by crisis, and the Widal reaction were the symptoms.

W. P. Northrup³ reports a case in an infant 9 months old, the symptoms being enlargement of the spleen and liver, fever for 24 days, rose spots, and diarrhea, the Widal test being positive on the fourteenth day.

A. D. Blackader⁴ analyzes the records of **100 cases** of typhoid fever in children, 4 of them being under 2 years of age. In 43 cases examined for the Widal test it was negative in 3. The mortality was 1%, the only fatal case being in an infant 13 months old, profoundly depressed and dying 5 days after admission. Treatment in a majority of cases was systematic cool bathing, the baths evidently being gaged according to the effects on the patient.

¹ *Id.*, May, 1901.

³ *Med. Age*, vol. XVIII, No. 9.

² *N. Y. Med. Jour.*, vol. LXXII, No. 4.

⁴ *Arch. of Ped.*, Sept., 1900.

J. F. Bell¹ contributes a carefully detailed report of an **epidemic of typhoid fever**, in which some of the cases were complicated by scarlet fever. The first case observed was in a child 11 years old, whose blood gave a negative test on the tenth and a positive reaction on the twelfth day. A count of the corpuscles gave a normal number of the red cells, and 30,000 leukocytes on the tenth day, and 80,000 leukocytes on the twelfth. The stained smears taken at the same time showed a leukopenia, and F. P. Solley, in consultation, suggested that the apparent leukocytosis might be due to an old Toisson solution, which proved to be the case. The second case, developing a week later in a child 2 years old, was in a tenement-house district, the houses being built on made ground, a swamp having been filled up only within a year. This patient, when first seen, had been sick for 10 days, and the discharges had been thrown undisinfected into a privy. The supplies of water and milk for this community were above suspicion, and no further cases developed for 6 weeks, when, in the next house, 4 children out of 5 and the mother came down with typhoid within 10 days, the infection being supposed to be the result of the contamination of the food by flies from the infected privy. The mother, who was 8 months pregnant, went on to term, although her attack was severe, and was delivered of a healthy-looking child, who for 8 days had fever, jaundice, rose spots, a dry and fissured tongue, and whose blood gave a positive Widal reaction 3 times in the course of the sickness. Of the 5 children only 1 escaped typhoid; 1 had primary typhoid and developed scarlatina on the twentieth day; 1 had primary scarlatina and developed typhoid on the tenth day; the other 2 with typhoid escaped scarlatina, although one of them was in the same bed with the boy who had scarlatina primarily. The other typhoid case that did not develop scarlatina did, however, desquamate, which the author attributes to a dermatitis exfoliativa, a not unknown complication of typhoid fever. As to the origin of the scarlet fever, there was an indefinite history of the disease having been in the house 16 years previously, and a week before this latter outbreak a partition had been torn down and many thicknesses of wall-paper had been removed.

W. L. Stowell² analyzes 61 cases of typhoid fever that have been under his care, the ages of the patients ranging from 9 months to 17 years, all recovering. In the therapeutics salol is highly recommended, cool sponging is preferred to bathing, and alcohol is used only in the form of liquid peptonoids.

A. Maude³ reports a case of typhoid fever in a boy 12 years old, with an **excessive rash** which covered the trunk, arms, thighs, neck, and face.

S. P. Phillips⁴ reports an **unusual complication** in typhoid fever—abscesses of the lung and empyema—occurring in brothers 4½ and 3 years old.

Tollemier⁵ observed a convalescent from typhoid develop a **lobar**

¹ Arch. of Ped., May, 1901.

² Arch. of Ped., Apr., 1901.

³ Lancet, No. 4032, 1900.

⁴ Brit. Med. Jour., No. 2095, 1901.

⁵ Rev. Mens. des Mal. de l'Enf., vol. XIX, No. 2.

pneumonia, the sputum containing typhoid bacilli and a few streptococci, but no pneumococci.

A. Seibert ¹ urges the **abandonment of the milk diet** in typhoid fever, on the ground that, as there is an enteritis, milk will furnish a culture medium for the germs and do harm as in acute gastroenteritis in infants. He suggests, instead, an exclusive soup diet, using meat broths containing oatmeal, barley, rice, and peas, strained. He couples with this the use of 2 to 4 rectal irrigations daily. Out of 153 cases so treated, 7 patients died, 3 being moribund and 4 having double pneumonia. The good results of the diet were seen in a steady lessening of headache, delirium, tympany, diarrhea, and fever, so that the uncomplicated cases had normal temperature in about 12 days.

Scarlet Fever.—W. J. Class ² has found his **Diplococcus scarlatinæ** in 300 consecutive cases of scarlatina. It is also found during scarlet fever epidemics in cases of acute tonsillitis which are without eruption, but are often followed by nephritis and sometimes by desquamation, and these cases the author states are merely scarlet fever without eruption, as they are subsequently immune to scarlet fever. He also ³ makes a further report on the germ, from which he has obtained a toxin. Pigs treated with the toxin developed an antitoxin.

A. Baginsky and P. Sommerfeld ⁴ made cultures from the heart's blood as soon after death as possible, in 42 cases of scarlet fever, and found in every case a **streptococcus** which they conclude is constant in all cases of scarlet fever. It is pathogenic and produces a toxin, but it cannot be differentiated from the other streptococci. Class ⁵ claims that the streptococci described by Baginsky and Sommerfeld correspond to the diplococci first described by him.

J. F. Schamberg ⁶ gives a **clinical and pathologic study of the rash** of scarlet fever, the true hue of which is more commonly a dull red with an appreciable element of brown; in addition to the erythema there may also be vesicles and papules of goose flesh. Desquamation seems to depend on the degree of vesiculation, starting over the dried vesicle and extending in irregular rings. Histologically the rash is a dermatitis with extensive changes in the corium about the hair follicles, which may be disintegrated. The depth of the lesions accounts for the slowness of desquamation and the infectivity of the scale.

H. E. Hayd ⁷ reports a case of scarlet fever **complicated by severe convulsions**, with recovery. He is of the opinion that convulsions may occur without albuminuria, indicating the need for frequent estimation of urea in the routine examination of the urine. Milk is the ideal food, but if not well borne, nothing but water need be given by the month, the strength being maintained by nutrient enemata.

A. Somers ⁸ observed a **pemphigoid eruption** as a complication of the rash in scarlet fever.

¹ Arch. of Ped., Sept., 1900.

² Jour. Am. Med. Assoc., vol. XXXV, No. 13.

³ Phila. Med. Jour., vol. v., No. 25.

⁴ Berlin. klin. Woch., 1900, No. 27 u. 28.

⁵ Jour. Am. Med. Assoc., Sept. 29, 1900.

⁶ Jour. Am. Med. Assoc., vol. XXXV, No. 19.

⁷ Med. Rec., Feb. 23, 1901.

⁸ Brit. Med. Jour., Nov. 3, 1900.

E. A. C. Baylor¹ reports a **similar case** in the father of 5 children, all of whom had scarlet fever. Vesicles appeared on the fourth day, coalescing to form large bullas. The patient was not ill enough to go to bed.

W. L. Somerset² gives the **statistics of 2627 cases** of scarlet fever admitted to the Willard Parker and Riverside Hospitals, New York, during 7 years. The death-rate was 9% as compared with 19% during the 7 preceding years, the more favorable showing being the result of excluding mixed cases of scarlet fever and diphtheria. The complications were: Acute degeneration of the kidney, 20%; cervical adenitis, 18%; otitis, 8%; nephritis, 4%; rheumatism, 4%; diffuse cervical cellulitis (usually fatal), 2%; myositis, endocarditis, pericarditis, bronchitis, ulcerative amygdalitis, less than 1%.

L. Stembo³ has confirmed in a number of cases the observation of Leichtenstern that **secondary swelling of the lymph-nodes** in scarlet fever precedes by a day or two the development of nephritis, the intensity of the latter corresponding to that of the former.

M. P. Hatfield,⁴ in an extensive consideration of scarlet fever, states that he has **never seen a typical second attack**.

Pertussis.—G. Arnheim⁵ found, in the sputum and in the lung in fatal cases of **pertussis**, **Czaplewski's pole bacteria**, which he was able to cultivate and which were pathogenic to white mice, although whooping-cough could not be produced in any of the lower animals used. [We have expressed our belief in former issues of the YEAR-BOOK that Czaplewski, Koplik, Affanassiew, and Ritter have all probably studied the same germ.]

C. Leroux and R. Pasteau⁶ report on a new treatment for whooping-cough, the **deep injection** once daily of **gomenol oil**. In 40 cases so treated the whooping ceased in 6 days on an average, and recovery was complete in 12 to 15 days. The injections should be continued for 4 or 5 days after recovery is complete.

Among the unusual variations of **local treatment** may be mentioned that used by E. M. Payne,⁷ who cured a severe case of pertussis in a boy 9 years old by **irrigation of the nostrils** 3 times a day with 10 to 20 ounces of a 1 : 40 **carbolic acid solution**. The discomfort of the first irrigations soon passed away.

H. T. Thomson⁸ highly recommends heroin in the treatment, having used it in 5 cases with great advantage.

P. Krause⁹ compared one group of cases of pertussis treated with **antitussin** with other groups treated with quinin, bromoform, and no medicines, and could see no specific effect from the antitussin. The disadvantages associated with its use, chiefly obstinate ulceration where it was applied, lead him to disapprove of it.

F. Villy¹⁰ reports a case of pertussis in a boy 3 years old, in whom

¹ *Id.*, Dec. 8, 1900.

² *Deut. med. Woch.*, No. 22, 1900.

³ *Berlin. klin. Woch.*, Aug. 6, 1900.

⁴ *Brit. Med. Jour.*, May 4, 1901.

⁵ *Deut. med. Woch.*, Aug. 23, 1900.

⁶ *N. Y. Med. Jour.*, vol. LXXII, No. 23.

⁷ *Med. Standard*, vol. XXIII, No. 2.

⁸ *Le Bull. Méd.*, June 13, 1900.

⁹ *Phila. Med. Jour.*, Jan. 12, 1901.

¹⁰ *M. Chronicle*, vol. III.

pneumothorax developed after severe coughing spells. The serious condition of the patient led to aspiration of the air, and slow improvement set in, followed by complete recovery.

Tuberculosis.—M. Henkel¹ reports an authentic case of **tuberculous meningitis which resulted in recovery**. The patient, a boy 10 years old, had ptosis, strabismus, rigidity, etc., and the fluid obtained by lumbar puncture contained tubercle bacilli on staining, culture being negative. Warm baths and calomel formed the basis of the treatment, and recovery was slow but complete.

B. F. Lyle² reports a case of **congenital tuberculosis**, the mother dying of advanced pulmonary tuberculosis 2 days after being delivered, the uterus being normal. The infant lived for 9 weeks, reaching its maximum weight, 5 pounds, when 8 weeks old. The temperature was subnormal for several weeks and fever then developed. At the autopsy the lungs, bronchial glands, spleen, liver, and kidneys were filled with tubercles.

The **medicinal treatment of tuberculous peritonitis** is discussed by I. B. Yeo,³ who reports 3 cases followed by recovery. The treatment consisted of the administration of $\frac{1}{4}$ grain of iodoform and $\frac{1}{2}$ minim of creasote 3 times a day, with 2 inunctions daily of iodoform ointment and cod-liver oil, equal parts. Surgical measures were adopted with advantage in 1 case, but the author thinks that in some cases they are inappropriate or used too early. He emphasizes the danger of infection from meat and milk, and in discussing the **value of iodoform**, believes that when it is rubbed on the skin, iodine enters the blood and is eliminated by the secretions, including those of the serous cavities. As the latter do not pass out of the body, they probably become so charged with iodine compounds that the latter may exert an antitoxic or an antibacterial action.

A. E. Kennedy and E. Steele⁴ report 2 cases of tuberculous peritonitis, in both of which operation showed **extensive involvement of the peritoneum**, one, a boy $4\frac{1}{2}$ years old, recovering, the other, an infant of 14 months, dying.

F. F. Friedman⁵ reports on the examination of the **tonsils** of 54 living and 91 dead children with reference to **lesions of tuberculosis**. In 2 of the autopsies primary tuberculosis of the tonsils was found distinctly and in 5 others probably, although in the latter group the bacilli were not demonstrated. No other lesions of tuberculosis existed in these cases. Some cases of involvement of the cervical glands had cicatrices in the tonsils, probably healed tuberculous foci. In an infant 24 days old, with healthy tonsils, a smear from the surface contained tubercle bacilli, probably carried there by food. Of the 54 cases of tonsillotomy during life, 52 showed no tuberculosis, although 6 had enlarged cervical glands and many had adenoids. Of the 2 remaining, one showed an apparently healed tuberculous lesion, while the other

¹ Münch. med. Woch., June 5, 1900.

² Phila. Med. Jour., Aug. 4, 1900.

³ Lancet, Mar. 16, 1901.

⁴ Lancet, Aug. 25, 1900.

⁵ Beitr. z. pathol. Anat. u. z. allg. Path., Bd. XXVIII, H. 7.

had tubercle bacilli in the right tonsil, with invasion of the cervical lymph-nodes. The author concludes that, practically, there are two sources of infection for the tonsils: primary, by the food, the other, secondary, by the sputum, both occurring in children in about equal frequency. Theoretically, other sources of infection are by the blood, the lymph, and inspired air, but such instances are unknown.

F. P. Norbury¹ quotes extensively from literature to show that **tuberculosis in children is often pulmonary** in its manifestations. He gives a concise discussion of the diagnosis, prognosis, and treatment.

V. Hutinel² discusses the **heredity of tuberculosis**, adopting the views that are generally accepted, that heredity is of importance in the causation of tuberculosis by means of a predisposition, a limited number of cases being infected *in utero*. The majority of cases in children show an acquired infection, and many cases in adult life have their start in infection received in childhood and remaining latent for a long time. Many cases with an inherited predisposition do badly, but there are a few which show an attenuated form of the disease, looking as though, with the predisposition, there was inherited also a special resistance.

A. D. Sotow³ describes the changes in the **cardiac ganglia in 2 cases of tuberculosis**, Nissl's method being used. The cells of the ganglia do not fill the capsules, which are hypertrophied, and the stroma is filled with rounded spindle-shaped cells. The chromatin bodies of the ganglionic cells stain poorly, indicating chromatolysis. Such changes may explain cases of sudden death in children with tuberculosis in whom the autopsy shows the process to be not far advanced. Experimentally, similar changes were produced by starvation and by elevation of temperature to hyperpyrexia.

A. Caillé⁴ reports the case of a girl 4 years old presenting symptoms of bronchitis, death suddenly occurring following pain in the neck, cyanosis, and asphyxia in spite of intubation and low tracheotomy. At the autopsy both bronchi were found plugged with cheesy material from a tuberculous bronchial gland which had perforated the trachea. In the discussion Rotch dwelt on the impossibility of diagnosis, and Dorning, Miller, and Freutnight referred to the **uncertainty of the so-called Eustace Smith's sign**, which consists of a murmur audible over the sternum when the chin is drawn upward.

Malaria.—G. N. Acker⁵ reports 2 cases of **malarial coma** in children, the diagnosis being confirmed by blood examination, recovery following the administration of quinin. In 1 case lumbar puncture was done, and although no fluid came away, the patient became conscious in an hour. [Hardly cause and effect.]

E. P. Stone⁶ reports a case of **malarial coma** in a boy $3\frac{2}{3}$ years old, recovery following a hot bath and quinin. The dose of the latter was 9 grains a day. Examination of the blood showed the plasmodium.

¹ Arch. of Ped., Dec., 1900.

² Arch. de Méd. des Enf., vol. III, No. 11.

³ Arch. f. Kinderh., Bd. XXIX, H. 3 u. 4.

⁴ Arch. of Ped., Aug., 1900.

⁵ Arch. of Ped., Nov., 1900.

⁶ Arch. of Ped., Jan., 1901.

J. C. Josephson ¹ reports an attack of **malaria in an infant** 3 weeks old, cyanosis and spasms occurring daily at 3 or 4 o'clock. Four grains of quinin daily cured in 5 days. The mother had a paroxysm of malaria on the eighth day of the puerperium.

Epidemic Cerebrospinal Meningitis.—A. R. Parsons and H. E. Littledale ² studied an epidemic comprising 7 cases of cerebrospinal meningitis in Dublin, 4 of the patients being children. They are convinced of the specificity of the meningococcus, but they were unable to find it in the nasal discharges. They analyze the symptoms presented, 4 of the patients recovering.

H. Handford ³ gives notes of 5 cases, 1 of which ended fatally after 14 weeks.

Tetanus.—A. E. Buckell ⁴ reports a case of idiopathic tetanus in a boy 12 years old, death occurring in 36 hours from the onset. No history of even slight trauma could be obtained. Twenty cubic centimeters of antitoxin, all that was obtainable, was given with bromid, chloral, and chloroform, but without influence.

Smallpox.—M. P. Hatfield ⁵ recommends baths of bichlorid of mercury or diluted hydrogen peroxid in smallpox, and quotes Begg, of China, who gives salol in full doses to prevent secondary suppuration. The author details the following interesting observation: In a family of 9, the father had once been inoculated with variola, 7 others had been vaccinated, and the youngest child was unprotected. A mild contagious disease started in the family, of so uncertain a type that no diagnosis was made until the father was attacked, when it was recognized as variola and the unprotected infant developed the confluent form and lost its eyesight. In these instances vaccination gave better protection than variola.

Vaccinia.—J. Sobel ⁶ has observed many cases of **generalized eruptions following vaccination**, the varieties being erythema, urticaria, papular, vesicular, and pustular eruptions, erythema multiforme, efflorescences, and bullous or pemphigoid eruptions. He estimates that these cases of generalized eruptions occur in 2% of all vaccinations, the total proportion of all complications being 14%. [From personal experience we should say that these figures are rather too high.] The differential diagnosis from measles, röteln, and varicella was often difficult in his cases.

Varicella.—A. H. Doty ⁷ corrects the belief that adults never have chickenpox. He has observed typical cases of it and finds that in differentiating it from smallpox, the latter, even when mild, usually is seen on the hands and feet, while in chickenpox this is rare. The back [as in children] is the best place to study the eruption of varicella.

L. Cerf ⁸ has collected 40 cases of **nephritis complicating varicella**. He has also ⁹ reviewed the literature on the **rashes** which may

¹ Med. Rec., Apr. 20, 1901.

² Brit. Med. Jour., No. 2060.

³ *Id.*, No. 2063.

⁴ Brit. Med. Jour., No. 2065.

⁵ Med. Standard, vol. XXIII, No. 9.

⁶ Med. News, No. 1439.

⁷ Med. Rec., May 4, 1901.

⁸ L'Angou Méd., Sept., 1900; Arch. de Méd. des Enf., Feb., 1901.

⁹ La Presse Méd., Oct. 6, 1900.

occur in **varicella**, 45 cases having been reported, 1 measles-like, 2 purpuric, 2 mixed, and 40 scarlatiniform.

Rötheln.—J. W. Moir¹ made observations in an epidemic of rötheln and found that the **invasion** is attended with a slight rise of temperature, headache, and sometimes mottling of the skin, followed in from 14 to 16 days by the development of the disease, which is associated in every case with enlargement of the postcervical glands.

H. Koplik² treats of the differentiation of rötheln from measles and scarlet fever. He lays emphasis on the absence of coryza and bronchitis and Koplik's spots, and the presence of enlargement of the lymph-nodes.

C. Dukes³ believes that what is called rubella is really composed of two distinct diseases,—**rubella** and the "**fourth disease**,"—of which he has seen several epidemics. It resembles scarlet fever closely, but it does not protect against either scarlet fever or rubella, nor do these protect against the "fourth disease"; and the fourth disease may be coincident with either of the others. [It must certainly be acknowledged that clinical variations are perhaps nowhere more abundant than in scarlet fever, and although the author makes a very suggestive report, it is possible that judgment may have to be suspended until the etiology of these diseases is definite.]

Syphilis.—D. L. Edsall⁴ reports a case of **syphilis of the liver** with large gummas in late childhood, and refers to the infrequency of the condition, and to the liability to error in diagnosis, the most frequent mistake being to call the condition splenic anemia. The author's case was sent into the hospital with the diagnosis of probable sarcoma of the liver. There was a mass half the size of the fist, in the left side of the epigastrium, attached to the liver and reaching to the umbilicus. To the right of the median line, 3 inches below the xiphoid cartilage, was a smaller mass. Both were tender and at times spontaneously painful. Deafness, ozena, and scars of interstitial keratitis pointed to a syphilitic taint, although the family history was negative, except for alcohol. After 2½ months of antisymphilitic treatment the general condition had much improved and the masses had entirely disappeared.

Erysipelas.—N. Fédé⁵ reports a severe case of erysipelas in an infant 16 months old cured by hourly hypodermic **injections** of a 2% **carbolic acid** solution in the buttocks. Thirty-eight injections were given in 8 days, making a total of 76 centigrams of the acid. Improvement began after the first injection.

Acute Anterior Poliomyelitis.—H. D. Chapin⁶ refers to several epidemics of **infantile paralysis** as tending to show that the disease is an **infectious** one and one having manifestations other than that of an acute anterior poliomyelitis.

E. D. Bondurant⁷ analyzes the cases of acute anterior poliomyelitis occurring in the State of Alabama, observed by himself and four others.

¹ Brit. Med. Jour., No. 2053.

² Jour. Am. Med. Assoc., vol. XXXV, No. 19.

³ Lancet, July 14, 1900. ⁴ Arch. of Ped., June, 1901. ⁵ La Pédatrie, Sept., 1900.

⁶ Arch. of Ped., Nov., 1900.

⁷ Med. News, No. 1440.

Fifteen of his cases occurred in one epidemic, a few adults being affected. The white and colored races showed no difference of susceptibility. Cerebrospinal meningitis was not epidemic at the same time. In most of the cases the paralysis was preceded for a few days by fever and gastrointestinal disturbances, but in a few cases the first symptom was that of paralysis.

Influenza.—F. Forelheimer¹ gives a thorough description of a cough in influenza simulating whooping-cough. Clinically the cases were ordinary influenza, but the author was able to find only streptococci in the discharges. In the respiratory cases the cough started its paroxysmal character with the onset, while in the intestinal cases the cough developed after a few days. It was highly contagious and did not protect against subsequent whooping-cough, nor were those who had had the latter protected against the former. The course was like that of pertussis, except that treatment was able to check it in a week or 10 days. Full doses of quinin were found by the author to be most successful.

A. Jacobi² discusses the treatment of influenza in children, recommending for the protracted vomiting rectal feeding and half-drop doses of Magendie's solution by mouth. For continued high temperature phenacetin and antipyrin are better than acetanilid for cardiac depression. Caffein is better than alcohol, the preparation preferred being the salicylate or benzoate of sodiocaffein in daily doses of from 3 to 10 grains. It may be also used hypodermically in extreme cases, but if it causes cerebral excitement it may be replaced by camphor in one-third the above dose. Strychnia is often useful, and a valuable remedy, now little used, is Siberian musk, in doses of 5 to 10 minims of a 10% tincture.

H. B. Sheffield³ gives a contribution to the study of influenza in children, the diagnosis of which rests on the presence of **Pfeiffer's influenza bacillus** in the expectoration, the simultaneous development of respiratory, digestive, and at times nervous phenomena, with early and pronounced prostration, out of proportion to the severity and duration of the attack. Among the complications are mentioned otitis, meningitis, pneumonia, nephritis or pyelitis, bradycardia, adenitis, and all varieties of cutaneous eruptions. The author highly recommends for the treatment sodium benzoate in doses of 1½ grains every 3 hours for a child 6 years old.

H. E. Garretson⁴ describes three forms of eruption seen in a grip epidemic, one being measles-like, one scarlatiniform, and one vesicular papules. In those resembling scarlet fever there was desquamation, but no contagion.

Glandular Fever.—L. Durno⁵ reports a series of cases of glandular fever occurring in epidemic form. All the patients but 1 were children from 2½ to 13 years old. The onset was sudden, with headache, nausea, vomiting, and pain in the affected side of the neck. The tem-

¹ Arch. of Ped., Nov., 1900.

² Med. News, No. 1457.

³ N. Y. Med. Jour., vol. LXXI, No. 26.

⁴ Jour. Am. Med. Assoc., vol. XXXIV, No. 11. ⁵ Brit. Med. Jour., No. 2080, 1900.

perature range was from 100° to 105° ; constipation existed. Within 36 hours after the onset there would appear a swelling on one side of the neck, consisting of several enlarged lymph-nodes, tender and movable. In one-third of the cases both sides of the neck were swollen. In a few cases there was also involvement of the postcervical and inguinal glands. The swellings disappeared without suppuration in about 3 weeks and convalescence was protracted out of proportion to the severity of the illness. Hemorrhagic nephritis complicated 2 of the cases and acute otitis media occurred in 2. The pharyngeal wall on the affected side was undoubtedly the portal of infection.

B. Thornton¹ refers to the **clinical course** as being **familiar**, while the etiology is obscure. In his case, a girl $5\frac{1}{2}$ years old, with a mitral murmur, the enlargement of the cervical glands was associated with fever and erythema nodosum, and the author thinks that the enlargement of the glands was probably of rheumatic origin.

The evidently varying etiology of the affection is leading a number of observers to **criticize the use of the term** "glandular fever." Thus, L. Guinon,² under the title "Does Glandular Fever Exist?" takes the ground with Labbé that the term is a bad one, as there is no specificity in either the etiology or the evolution. Adenopathy is held to cover all the cases, with a suitable qualifying term according to the cause.

J. P. C. Griffith³ **questions the existence** of the affection as a separate disease, having observed 5 cases of influenza which simulated it.

Alfred Hand, Jr.,⁴ reports 8 cases in which throat-cultures gave varying results. He refers to the **uncertain etiology** and adopts Mugga's term "acute cervical lymphadenitis" as being more accurate and without dogmatism as to the cause.

Londe and Troin⁵ report a case in a boy of 3 years, cultures of the pharyngeal mucus giving the **pneumococcus** in pure growth. There had been a case of pneumonia in the family preceding the boy's illness.

Infections Unclassified.—That some children take **nearly every disease** that may come their way is illustrated by H. Harlan's⁶ history of a boy who contracted measles at 18 months, followed by otitis media. Four months later he had scarlet fever, followed immediately by diphtheria, with discharge from both ears. Suppuration of the cervical glands, summer diarrhea, and mastoiditis were next in order, after which pneumonia developed complicated by empyema, which necessitated resection of a rib. Varicella came next, but pertussis was escaped, although other children in the house had it. A second mastoid operation was done with good healing, cessation of discharge, and perfect hearing, and a period of good health set in, temporarily interrupted by an attack of pneumonia, from which he recovered.

E. Weill and Galavardin⁷ mention that **rheumatism cannot be**

¹ *Ibid.*, No. 2050.

² *Rev. Mens. des Mal. de l'Enf.*, May, 1901.

³ *Univ. Med. Mag.*, Oct., 1900.

⁴ *Ibid.*

⁵ *Rev. Mens. des Mal. de l'Enf.*, Feb., 1901.

⁶ *Maryland Med. Jour.*, vol. LIII, No. 5.

⁷ *Rev. Mens. des Mal. de l'Enf.*, Apr., 1901.

considered a disease special to the serous structures, in view of the many pulmonary, renal, cerebral, myocardial, and other manifestations, and they report a case of chorea presenting a heart-murmur and nodosities over the tendons of the arms and legs. The patient, a girl 7 years old, died suddenly, and a histologic examination showed an acute interstitial myocarditis. The periosteal nodosities were found to be exudates of fibrin with some small cell infiltration, while those over the tendons were aggregations of small round cells without fibrin. Examination of the central nervous system showed no changes that could be considered causative of the chorea.

F. J. Poynton ¹ studied the **heart-wall** in diphtheria, **rheumatism**, and chorea in order to see if there was not a toxic action on the heart-muscle in rheumatism as in diphtheria. Changes were found similar in kind, but to a less degree, which explains the greater mortality in diphtheria from heart-failure and the greater tendency to dilation of the heart in rheumatism.

F. M. Crandall ² reports a case of **tonsillitis with some unusual features**, the membrane being thick and pultaceous (diphtheria bacilli being absent) and disappearing rapidly, there also occurring an intense erythema multiforme lasting a week and fading slowly.

W. J. Class ³ makes the following **classification of the etiology of the anginas**: (1) Those caused by the pneumococcus, the largest and most important group; (2) those caused by the diphtheria bacillus; (3) those caused by *Streptococcus pyogenes*; (4) those caused by *Diplococcus scarlatinae*; (5) those caused by the influenza bacillus; (6) those caused by *Staphylococcus pyogenes*; (7) mixed infections, two or more of the above species being present.

W. G. Bissell ⁴ studied cultures from 3 cases of **membranous angina** and found in one *Streptococcus pyogenes*, and in another the micrococcus of sputum septicemia, and in the third *Oidium albicans*. The first and second cases ended fatally. From the sanitary standpoint quarantine is held to be unnecessary.

W. R. Nicholson ⁵ reports a case of **melæna neonatorum** in a male infant, starting on the sixteenth day after birth, and ending fatally in 3 days. At the autopsy *Staphylococcus pyogenes aureus*, *Bacillus lactis aerogenes*, and *Bacillus pyocyaneus* were obtained, the last being considered the dominant infection.

J. S. Fowler ⁶ reports a case of **streptococcic infection**, a streptococcus-stomatitis being followed by pneumonia and general infection, recovery following the use of antistreptococcus serum. There was a relapse of the pneumonia after a month, and recovery again followed the use of the serum. Three weeks after this, measles developed, the child having shown loss of weight during the period of incubation, a point to which Meunier called attention. [U. YEAR-BOOK for 1900, p. 275.]

¹ Lancet, No. 4002, 1900.

³ Interstate Med. Jour., vol. VII, No. 3.

⁵ Am. Jour. Med. Sci., vol. CXX, No. 4.

² Arch. of Ped., Apr., 1901.

⁴ Buffalo Med. Jour., vol. XI, No. 5.

⁶ Arch. of Ped., May, 1901.

DISEASES OF THE ALIMENTARY TRACT.

Stomatitis.—W. S. Bainbridge¹ reports 2 cases of cancrum oris, one resulting fatally, the other recovering after extensive loss of bony structure. The need for early curing and thorough cauterization with nitric acid is emphasized.

Retropharyngeal Abscess.—I. M. Snow² reports a case of enlargement of a retropharyngeal lymph-node without suppuration and 2 cases of abscess-formation, one case recovering after evacuation, the other dying suddenly on the introduction of the mouth-gag before the abscess could be incised. The author believes that the use of the gag caused some disturbance of the vagus, as artificial respiration immediately resorted to was ineffectual.

Cyclic Vomiting.—J. P. C. Griffith,³ in writing on cyclic vomiting, reports 4 cases, 2 of which resulted fatally. As the attacks do not occur at regular intervals, the author prefers the term "recurrent" rather than "cyclic." In treatment he recommends that after one attempt to move the bowels by salines or calomel, the stomach should be given absolute rest and the rectum should be used for concentrated nutrient enemata and full doses of bromid and chloral. Morphin hypodermically has done good in some cases.

Perverted Appetite.—P. Simonini⁴ reports 3 cases in girls of 8, 9, and 11 years, all the patients presenting marked chlorotic anemia. The youngest one had been a dirt-eater and was accustomed to take large amounts of raw rice, some of which was found undigested in the stools. The oldest one chewed dried twigs of the acacia tree, and the other one consumed large quantities of salt and also had a fondness for smelling kerosene oil.

Congenital Hypertrophic Stenosis of the Pylorus.—E. Gillot⁵ reviews the subject of congenital stenosis of the pylorus, collecting 33 cases. He points out that there are two kinds of pyloric stenosis in newborn infants—an organic and a spasmodic. T. S. Southworth⁶ reports a case of congenital spasmodic stenosis of the pylorus in which vomiting persisted for 15 days and then ceased suddenly, followed by recovery. The vomiting began on the third day, coincident with the flow of milk, and no milk-stool appeared until the ninth day, when a small, well-digested one was passed. [The author does not give a report on the analysis of the mother's milk, and as it is possible that the spasm of the pylorus and the vomiting might have depended on a high proteid percentage which would tend to lessen as the mother took more exercise, the use of the term "congenital" in the description of the case might be inappropriate.] A. Blackadder⁷ reports a fatal case in an infant 8 weeks old, and discusses the diagnosis. E. Cautley⁸

¹ Arch. of Ped., June, 1901.

² Arch. of Ped., Jan., 1901.

³ Am. Jour. Med. Sci., vol. CXX, No. 5.

⁴ Gaz. degli Ospedali e delle Cliniche, Dec., 1900; Arch. de Méd. des Enf., June, 1901.

⁵ Thèse de Paris; Arch. de Méd. des Enf., Jan., 1901.

⁶ Arch. of Ped., Jan., 1901.

⁷ Brit. Med. Jour., Mar. 30, 1901.

⁸ Lancet, No. 4013.

reports a case in a bottle-fed female infant, 3 months old, ending fatally a day after coming under observation. The autopsy showed great dilation of the stomach with thinning of its walls and much hypertrophy of the circular muscular fibers of the pylorus. H. D. Rolleston and R. Crofton-Atkins¹ observed a case, in a male infant, artificially fed, in whom diarrhea preceded the constipation, the vomiting being irregular. Death occurred in the eighth week, the autopsy showing a pin-point lumen to the pylorus, with great increase in the circular muscular coat. The authors believe that the condition is congenital, with spasm aiding in the production of the symptoms. W. Knoepfelmacher² reports an unusual degree of hyperchlorhydria in an infant 10 months old, the gastric juice showing 0.95% of free HCl. The symptoms suggested congenital stenosis of the pylorus, but recovery followed the use of pure cows' milk.

Acute Dilation of the Stomach.—G. Coates³ reports a case in an infant 3 weeks old, recovery following daily lavage.

Duodenum.—L. Cordes⁴ collects 56 cases of congenital occlusion of the duodenum and reports the fifty-seventh, occurring in a female infant with a negative family history, dying 4 days after birth. The duodenum was much distended in its first portion and there was a constriction 8.5 centimeters below the pylorus. While the etiology is not clear, malformation is probably the most frequent cause. V. Adriance⁵ gives the clinical history and autopsy findings in the case of an infant 10 months old in which a duodenal ulcer was found.

Enteritis.—Escherich,⁶ in a philosophical article, discusses the **role of microbes** in the gastrointestinal diseases of nurslings, pointing out that it is of first importance to study the normal conditions of the intestinal tract. After detailing methods of procedure, emphasis is laid on the fact that the colon bacillus from one infant can be distinguished by means of the Gruber-Widal reaction from colon bacilli from other infants. The statement is then made that the normal growth of germs in the intestine is the result of, and also one of the conditions necessary to, a healthy discharge of the functions. If now there occurs any change in the chemie composition of the intestinal secretions, or contents, or in the conditions of absorption, or in the vital resistance of the individual, there will ensue a change in negative conditions in the intestine favoring the multiplication of other germs introduced from without. Infants are especially susceptible to these ectogenous infections because of their food, milk, and the lack of protection furnished by the stomach. The author then makes the etiologic classification of (1) intoxications due to ectogenous decompositions; (2) infection of the chyme; (3) infectious diseases of the intestine. The first and second may be caused by any of the saprophytes in milk or in the intestine, while under the third there have been recognized infections with staphylococci, streptococci, the colon bacillus, streptothrix, and Bacillus

¹ Brit. Med. Jour., Dec. 22, 1900.

³ Lancet, Dec. 8, 1900.

⁵ Arch. of Ped., Apr., 1901.

² Wien. klin. Woch., Dec. 20, 1900.

⁴ Arch. of Ped., June, 1901.

⁶ Arch. de Méd. des Enf., vol. 111, No. 12.

pyocyanus. Mixed infections also occur. W. W. Babcock ¹ also treats of certain bacteriologic features of **gastrointestinal infections** in infants, referring to the immense number of bacteria introduced by milk into the alimentary canal. These bacteria are usually harmless saprophytes, but some may be pathogenic, especially when the infant's vitality is lowered. He recommends microscopic examinations of milk and stools in all cases of gastroenteritis. C. G. Kerley ² discusses the **treatment of summer diarrheas** in children, giving the treatment which harmonizes with the consensus of the best opinions. Valenza ³ reports a case of **autointoxication** in an infant 14 months old, fed on asses' milk, which is especially liable to fermentation. The symptoms comprised fever, a scarlatiniform rash on the face and neck, with a bright red erythema on the trunk resembling erysipelas at its border. Tympanites was present and purgatives were therefore given, with the result that all of the symptoms disappeared, but on the next day the child was tetanic, with edema of the face, back, and fingers, and the skin was desquamating. Recovery followed in a few days with the use of pepsin, sodium benzoate, caffeine, and irrigation of the colon. J. W. Wainwright ⁴ reports a case of **obstipation** in a boy 5 years old, no movement having occurred for five days in spite of repeated enemas and massage. The history was that the boy had hurriedly swallowed some cheese, which was supposed to be blocking the ileocecal valve. Opium was finally administered in 2-drop doses of the deodorized tincture every half hour until narcosis was complete. Belladonna was given twice and the opium course repeated, when a large knuckle-shaped mass of cheese was passed by the bowel. The author states that the opium acts in such cases by producing muscular relaxation and allowing the mass to pass the valve by gravity. [We should like to emphasize not only the value of opium in such cases and in cases of acute enteritis with constipation, but also the comparative rarity of their occurrence and the extreme caution with which the drug should be administered.] W. E. Fitch ⁵ considers **tannopin** to be an ideal **intestinal disinfectant**. It passes through the stomach unchanged and is decomposed in the intestine into its proximal constituents, tannin and urotropin. It is nonirritating, tasteless, odorless, and insoluble, and may be used in like doses to bismuth.

Peritonitis.—C. G. Cumston ⁶ reports a case of acute tuberculous peritonitis in a boy 6 years old, the tip of the appendix being strangulated by a band. Laparotomy with removal of the appendix was followed by recovery.

Dilation of the Colon.—Cases are reported by T. Fisher ⁷ in infants 6 and 13 months old, both fatal, and by Fletcher ⁸ in a boy 4 years old, improvement following irrigations. W. S. Fenwick ⁹ reports

¹ Internat. Med. Mag., vol. IX, No. 7.

² Med. News, Aug. 4, 1900.

³ Gaz. degli Ospedali e delle Cliniche, Sept. 16, 1900; Arch. of Ped., Mar., 1901.

⁴ Boston M. and S. Jour., vol. CXLIII, No. 7.

⁵ N. Y. Med. Jour., vol. LXXII, No. 7.

⁶ Pediatrics, June 15, 1901.

⁷ *Id.*, May 15, 1901.

⁸ Johns Hopkins Hosp. Bull., May, 1900.

⁹ Brit. Med. Jour., Sept. 1, 1900.

a case in a boy 17 months old. Constipation set in when the infant was a few weeks old and had ever since been obstinate. The abdomen was tremendously distended, and the diagnosis was made of congenital idiopathic dilation of the colon, which the autopsy confirmed.

Liver.—E. Lesné and P. Merklen¹ studied the functions and changes of the liver and kidneys in **gastroenteritis**, finding no specific anatomic changes, but congestion, degeneration, or sclerosis, depending on the duration of the illness. Indicannuria was often, but not always, present. Alimentary glycosuria occurred only in the chronic cases, not in the acute. Urea was diminished and the toxicity of the urine increased. Cultures of the colon bacilli were fed to and injected into guinea-pigs, with the production in the liver and kidneys of lesions similar to those in infants dying of gastroenteritis.

C. Folger² reports an unusual case of **hypertrophic cirrhosis** in a boy 3 years old. The etiology was obscure. Jaundice, absent at first, suddenly became marked and cholemia set in, followed by death. The liver weighed 1750 grams.

H. D. Rolleston and L. B. Hayne³ report a case of **congenital hepatic cirrhosis with obliterative cholangitis** in an infant 6 months old. At the autopsy the liver was found to be double its normal size.

C. Oddo⁴ refers to 66 cases of **abscess of the liver in children**, and holds that it is no longer to be regarded as a curiosity, but that it has certain peculiar features distinguishing it from the disease in adults. In the former it rarely follows dysentery or gall-stones, but its most common causes are appendicitis, tuberculosis, umbilical phlebitis, helminthiasis, and traumatism. He reports a case due to abdominal traumatism, in a boy 13½ years old, and after a discussion of the subject concludes that while abscess of the liver is comparatively rare in children, a greater proportion than in adults follows traumatism, probably because of the greater frequency with which children receive blows on the abdomen. The abscess may develop immediately after the injury or there may be a quiescent period. The abscess may be called primary when the blow is in the hepatic region, and secondary when the blow falls elsewhere. The symptoms are those usual to abscess of the liver and the tendency is to spontaneous opening either through the skin or into a bronchus or the pleura, or a subdiaphragmatic pyopneumothorax may form. Recovery is better after surgical intervention.

L. Morquio⁵ reports a case in a boy 11 years old, the traumatism resulting from a “flat” dive into the water from a height of 10 feet. Recovery followed operation.

W. Pepper⁶ reports 1 case and collects 5 from the literature of **congenital sarcoma of the liver and suprarenal**. The peculiar features are swelling of the abdomen with enlargement of the liver in the first 5 weeks of life, absence of fever, of jaundice, of pigmentation,

¹ Rev. Mens. des Mal. de l'Enf., Feb., 1901.

² Jahrb. f. Kinderh., Oct., 1900.

³ Brit. Med. Jour., Mar. 30, 1901.

⁴ Rev. Mens. des Mal. de l'Enf., Jan., 1901.

⁵ *Id.*, June, 1901.

⁶ Am. Jour. Med. Sci., Mar., 1901.

and of ascites, death occurring in a few weeks. In the author's case the liver and the right adrenal were infiltrated with lymphosarcomatous tissue. The disease differs from primary sarcoma of the adrenals, and primary sarcoma of the liver probably does not occur, so this is held to be a congenital primary involvement of both liver and suprarenal.

DISEASES OF THE RESPIRATORY SYSTEM.

Adenoids.—F. Huber¹ discusses the importance of the diagnosis and treatment of adenoids by the general practitioner. After mentioning the varied complex of symptoms which may be present, he states that the diagnosis may be established by the presence of a small, painless, movable lymph-node at each angle of the jaw and by numerous small lymphoid hypertrophies in the mucous membrane of the posterior pharyngeal wall.

Congenital Laryngeal Stridor of Infants.—This subject is receiving considerable attention in England and France, one view, as represented by J. Thomson and A. L. Turner,² being that it is a choreiform respiratory spasm, the primary element in the causation being a disturbance of the coordination of the respiratory movements, probably due to some developmental backwardness of the cortical structures which control them; that the change of form found in the larynx is only an exaggeration of the normal infantile type, no evidence of any congenital malformation existing, and that this change of form is due to the constantly recurring sucking in of the upper aperture of the soft larynx, the deformity therefore being acquired, and analogous to pigeon-breast. The authors exclude from any part in the causation pharyngeal conditions, adenoids, and enlargement of the thymus or bronchial glands. The authors studied many normal larynxes and give illustrations in support of their statements. The other view is that set forth by Variot's assistant, P. Bruder,³ who believes that there is a congenital anatomic defect, two types of which may exist. The first type consists of a folding in of the epiglottis so that it forms a narrow gutter, the soft aryteno-epiglottic folds forming a narrow chink, while, behind, at the upper opening of the larynx, there are folds which vibrate in inspiration. In the second type the malformation is limited to the epiglottis, which is rolled on itself to form a vibrating reed above the larynx. As a result of this, the arytenoepiglottic folds are approximated anteriorly and the stridor is the result of their vibration. As the larynx stiffens with age, the condition disappears. A. Guilbert⁴ adds to the above causes spasm of the larynx and enlargement of the bronchial glands [conditions which are not usually congenital].

Croup.—L. Symes⁵ states that there is no such disease as croup, but that as a symptom it may come from diphtheria or stridulous laryngitis, and that in doubtful cases the diphtheria antitoxin should be used,

¹ Arch. of Ped., Mar., 1901.

² Brit. Med. Jour., Dec. 1, 1900.

³ Thèse de Paris; Arch. de Méd. des Enf., June, 1901.

⁴ *Ibid.*

⁵ Dublin Jour. Med. Sci., No. 343.

as all deaths from croup are due to diphtheria and the antitoxin reduces the mortality greatly, enabling many cases to be tided over with the help of intubation.

Bronchitis.—S. S. Adams ¹ advises inhalations of steam in treating bronchitis in infants and young children. Opium is to be used only if cough is incessant; emetics are hardly ever necessary, but cardiac stimulants, alcohol and nitroglycerin, are often needed. In dyspnea, a general hot bath (110° to 120°) will do much good.

A. C. Cotton ² reports a case of **generalized subcutaneous emphysema** in a girl 7½ years old, following a hard coughing spell; dyspnea and cyanosis developed and the child died after 6 days.

Pneumonia.—W. N. Fisher ³ observed 4 cases of croupous pneumonia in infants in whom the temperature rose again after the crisis, the rise occurring with the beginning of resolution and bearing a distinct relation in its degree to the extent of the liquefaction area. With further improvement in the lung the temperature subsided. The author is of the opinion that such a rise is often a benign process instead of indicating an extension of the consolidation or an involvement of the pleura.

Bernheim ⁴ reports a case of pneumonia in an infant 14 months old, ending fatally, the **meningococcus being recovered from the lung**. He points out that the germ may cause pneumonia or bronchitis, the latter being harmless for the patient, but there is the possibility that the patient may act as the focus for an epidemic of meningitis.

Pleurisy.—Bezy and Bauby ⁵ detail the notes of 3 interesting cases of empyema. The first, in a boy 4 years old, was evidently of gradual development, and became an empyema necessitatis, the pneumococcus being the cause. The second followed typhoid fever, colon bacilli and streptococci being found in the pus. In the third the diagnosis was in doubt for a long time, and just before aspiration was about to be done, the child vomited considerable pus, from which the usual flora of a putrid pleurisy were obtained—streptococci, staphylococci, and colon bacilli.

DISEASES OF THE CIRCULATORY SYSTEM AND BLOOD.

Heart.—H. Koplik ⁶ discusses the **causation and diagnosis of myocarditis**, and lays emphasis on the need for sustaining the child's nutrition.

F. A. Packard ⁷ treats of the **antecedents of organic heart-disease** in children and concludes that a history of rheumatism and other infections is not sufficient to account for the majority of cases of organic heart-disease, and many cases must therefore be attributed to colds, affections of the mucosae of the nose and throat, etc.

C. Looft ⁸ found in 15 cases of anemia a systolic murmur in the region of the apex without enlargement of the heart and with no accen-

¹ Med. News, No. 1458.

² Phila. Med. Jour., No. 142.

³ Arch. de Méd. des Enf., Jan., 1901.

⁴ Jour. Am. Med. Assoc., vol. XXXV, No. 25.

⁵ Rev. Mens. des Mal. de l'Enf., Oct., 1900.

⁶ Arch. of Ped., Sept., 1900.

⁷ Deut. med. Woch., Oct. 4, 1900.

⁸ Med. News, vol. LXXVI, No. 13.

tuation of the pulmonic second sound. He thinks that these should be considered "**accidental inorganic murmurs.**"

J. Halla and P. Armand-Delille¹ observed **coincidence of acute rheumatic endocarditis with a congenital lesion**, persistence of Botal's duct. The latter gave no symptom nor sign during life. The patient, a boy 3 years old, had well-marked articular rheumatism with valvular lesions, and the congenital lesion was discovered at the autopsy.

A. C. Cotton² gives the notes and autopsy-findings in a case of congenital heart-disease, with chronic endocarditis of the aortic and mitral valves and a **defect at the base of the anterior aortic valve**. This allowed of regurgitation, which had produced marked hypertrophy of the heart. The child lived for 5 days, during which time no urine was passed. There was nothing in the mother's state of health to account for the lesions.

S. M. Hamill³ reports a case of **pulmonary stenosis** in a boy 6 years old, without cyanosis or clubbing of the fingers.

J. Thomson⁴ gives an interesting report of an apparently **congenital heart lesion** in an infant of 9 weeks, presenting cyanosis, rapid pulse, and a loud systolic murmur heard best over the base of the heart, especially to the left of the sternum. The pulmonary second sound was normal and not accentuated. The heart was not hypertrophied in any direction nor were the fingers clubbed. The child **improved** while under observation for 7 months and was not seen again for 7 years, when she was brought back fairly **healthy** in appearance and with no signs of heart-disease. The author thinks the condition is explained by a patulous ductus arteriosus, which gradually closed.

G. M. Swift⁵ discusses the **care of children with mitral lesions**, pointing out that rest in bed is often necessary for an indefinite period, followed by careful regulation of exercise. Nutrition should be pushed and further rheumatic attacks combated.

J. M. Taylor⁶ gives an extended consideration of the relief of chronic heart-disease in children by means of systematic movements.

A. E. Roussel⁷ reports 3 cases of **malignant endocarditis**, 1 following measles, 1 after typhoid fever and simulating splenic leukemia, and the third ending in recovery.

L. Hektoen⁸ gives the autopsy findings in 2 cases of congenital heart-disease, the lesions in each case being rare. The first one showed a large **opening in the septum** between the aorta and the pulmonary artery, the ductus arteriosus, which was beyond, being patent. Nine similar cases have been reported. The other heart was hypertrophied generally, the ductus arteriosus was patulous, and there was regurgitation into the left ventricle through an **opening at the base of the anterior aortic valve** which was carried across on a tendinous bridge.

Blood.—P. Heim⁹ is of the opinion that the **leukocytosis** in pneu-

¹ Arch. de Méd. des Enf., May, 1901.

³ *Ibid.* ⁴ *Id.*, Mar., 1901.

⁶ Am. Med., May 25, 1901.

⁸ Am. Jour. Med. Sci., vol. CXXI, No. 2.

⁹ Arch. de Méd. des Enf., Jan., 1901.

² Arch. of Ped., Oct., 1900.

⁵ Arch. of Ped., Feb., 1901.

⁷ Med. Rec., Apr. 20, 1901.

monia does not depend on the severity of the disease nor the height of the fever, but rather upon the **virulence** of the germ and its toxin and upon the **reaction** of the system. With Buchner, he believes that the alexins normally secreted by the leukocytes constitute the first line of defense of the organism, the second line being new alexins secreted by the cells under the stimulus of the germs. Therefore, if the individual has an abundant supply of alexins, there will be no need for a great increase in the leukocytes to manufacture a fresh supply. On the other hand, if the microbes are very virulent, there will be a great demand for alexins. The course of the pneumonic leukocytosis has no regular law, and the only diagnostic value it has is that it is not present in the intestinal infections simulating pneumonia. Prognostically, it indicates either the virulence of the germ or the reaction of the organism, and a fall in the number may indicate either a crisis or a pseudo-crisis. A hypoleukocytosis in pneumonia is of grave import. As to the proportions of the different forms of leukocytes, the polynuclears are greatly increased, while the lymphocytes are much diminished, the eosinophiles disappearing completely. The author has seen eosinophiles present in but 1 case in which nephritis was a complication, and this disease increases the eosinophiles. [In a clinically uncomplicated case of pneumonia in a child we have recently had the opportunity of observing the above changes, with the exception that the eosinophiles were present in the proportion of 0.1 %.] The author attaches considerable diagnostic value to the eosinophiles, stating that their absence is a point in the differential diagnosis of croupous from catarrhal pneumonia. They can also point out whether a pneumonia is prolonged or wandering, being present in the latter. Caseous pneumonia with an abundance of eosinophiles can thus be recognized from croupous pneumonia, and the latter, when meningeal symptoms are present, can be recognized from tuberculous meningitis with its eosinophiles. Finally, pleurisy can be distinguished from massive pneumonia, eosinophiles being present in the former. In **diphtheria the leukocytosis depends**, as in pneumonia, on the **virulence** of the germs and the **reaction** of the system, but not on the temperature nor the gravity of the attack. One of the author's cases, with a count of 28,000, surpassed the maximum limit, 17,000, observed by Gilbert. Absence of the increase is not necessarily a bad sign. As a rule, the leukocytosis reaches its height when the disease is at its maximum, the number of cells subsiding gradually until the membranes have disappeared. Antitoxin causes a reduction of 4000 to 8000 leukocytes in a few hours, but this is transitory. The only diagnostic value the leukocytosis has is that its persistence after the membrane has disappeared means some grave complication. It has no prognostic significance, but may be used as a means of determining whether sufficient antitoxin is being administered, the dose being insufficient if it is not followed by the reduction in the leukocytes. The qualitative changes in the leukocytes are similar to those in pneumonia, an increase of the polynuclears, a decrease of the lymphocytes, with an almost total disappearance of the eosinophiles. In cases due to the Klebs-Löffler bacilli

and streptococci, eosinophiles persist. In convalescence the number of eosinophiles may rise to 13 %. The author states that if, on the first or second day after antitoxin is given, the polynuclears are less than 50 %, the prognosis is very bad ; but he does not agree with Bessedra that a fatal termination is necessarily inevitable even if the pulse and general health are good.

M. Bize ¹ calls attention to the fact that his thesis, published in 1899, contained conclusions similar in all respects to the above as bearing on diphtheria, except with regard to the eosinophiles.

A. Japha ² made a series of blood-counts in sick and well children before and after feedings and found that a **digestive leukocytosis is not a regular phenomenon** and can have no diagnostic value. He is also of the opinion that in adults it is more a coincidence than an essential phenomenon of absorption. When present, it consists of an increase in the polynuclears.

M. Carstanjen, ³ in a discussion as to the **normal proportions of the different leukocytes** in health, gives the following conclusions with regard to children : For the first day of life the blood is rich in polynuclears and poor in lymphocytes, with a gradual change until, by the sixth to the ninth day, the two forms are equal. By the twelfth day the lymphocytes are in excess, a condition which persists for several months. Transitional forms are also numerous. Eosinophiles are not specially increased, but vary with the individual rather than with the age. Nucleated red cells are common for the first 3 days of life. Large mononuclear leukocytes are few. From the sixth month to the fifth year the proportion of polynuclears slowly increases, the lymphocyte-curve steadily decreasing.

A. Stengel and C. Y. White ⁴ contribute an article on the **blood in infancy and childhood**, in which they first discuss the normal conditions of the blood in healthy children, quoting extensively from the literature. The conditions in disease are similarly treated, and the authors then give the results of their observations in pneumonia, typhoid fever, pertussis, varicella, tuberculous cold abscess, acute rheumatism, noma, bronchitis, pleural effusion, enteritis, mitral heart-disease, rachitis, eczema, focal epilepsy, convulsions, spastic cerebral palsy, and chronic meningitis. In general the red cells showed no special morphology as compared with the blood of adults, except that polychromatophilia, irregularities of shape and size, and nucleated red cells occurred in more moderate anemias than would be the case in adults. In the leukocytes the basophilic granules were prominent, occurring even in the polymorphonuclears. Similar large granules were sometimes seen either in the protoplasm of the lymphocytes or on the point of extrusion. Mast cells and myelocytes were occasionally seen, but no significance could be attached to their presence. The number of leukocytes was somewhat higher than would be expected in adults, except in the cases of typhoid fever, when they were of the usual lessened number.

¹ *Id.*, Feb., 1901.

³ *Jahrb. f. Kinderh.*, 1900.

² *Jahrb. f. Kinderh.*, 1900.

⁴ *Arch. of Ped.*, Apr., 1901.

Purpura.—S. S. Burt ¹ reports a case of purpura hæmorrhagica, or Werlhof's morbus maculosus, setting in with a purpuric eruption, and bleeding from the gums, followed by epistaxis, hematemesis, and melena. Stupor and delirium appeared on the seventh day and death occurred on the tenth day in spite of active treatment. R. Muir ² observed **purpura** in a boy 14 years old associated with **intense anemia**, the red cells falling 2 weeks before death to 640,000. At the autopsy there was widespread fatty degeneration of all the organs, iron-pigment was found in the liver and kidneys, and the marrow of the long bones, instead of being red, was white and fatty. The author considers the primary condition to have been the deficiency in the marrow, producing the anemia, the purpuric symptoms depending on toxemia or infection.

Leukemia.—Moizard and Ulmann ³ report a case of leukocythemia in a girl 5 years old, the proportion of white cells to reds being 1 : 23. Dyspnea, cyanosis, and cough were marked symptoms during life and were supposed to be due to pressure by enlarged bronchial glands, but the autopsy showed that the thymus was probably chiefly responsible, as it weighed 111 grams. The authors have collected 14 similar cases from the literature.

CONSTITUTIONAL DISEASES.

Scurvy.—W. M. Mastin ⁴ reports 4 cases of scurvy in infants and refers to some of the conditions for which it may be mistaken and to the relationship of the disease to pernicious anemia, as pointed out by J. L. Duènas, ⁵ who reported a case illustrating this association. In 1 of Mastin's cases the previous diagnosis had been rheumatism and syphilitic periostitis. In this case the anemia was so intense that the child succumbed in a few weeks to an enteritis. In the second case the trouble was supposed to be coxalgia, in the third some spine injury or serious cord lesion, and in the fourth some bone disease had been suspected. J. P. C. Griffith ⁶ reports 16 cases of scurvy, in many of which rheumatism had been diagnosed. In 2 cases hematuria was the only symptom, and in several of the cases the etiology seemed to depend on low proteid percentages. H. A. Hare ⁷ also refers to the frequency with which the disease is mistakenly called rheumatism, and mentions 3 such cases. F. Cima ⁸ reports a rare case of **scurvy in a breast-fed infant** 6 months old, the mother's supply of milk being scanty. Kissel ⁹ reports 2 cases of **scurvy in twins** who had been **breast-fed** for 4 months and then fed on boiled milk and bread. Both contracted measles later and died. Variot ¹⁰ reports a case in a male infant fed on **maternized milk**. C. Fisher, ¹¹ clinging to the English term of "**scurvy-rickets**," reports 2 cases in girls of 9 and 12 months of age, artificially

¹ Boston M. and S. Jour., vol. CXLIII, No. 18.

² Brit. Med. Jour., 1900, No. 2074.

⁴ Phila. Med. Jour., Apr. 20, 1901.

⁶ Phila. Med. Jour., Feb. 2, 1901.

⁸ La Pediatria, July, 1900.

¹⁰ Soc. Méd. des Hôp., Mar., 1901; Arch. de Méd. des Enf., May, 1901.

¹¹ Brit. Med. Jour., Apr. 6, 1901.

³ Arch. de Méd. des Enf., vol. III, No. 12.

⁵ Arch. of Ped., Jan., 1901.

⁷ Med. News, Feb. 16, 1901.

⁹ Med. Woch., No. 31, 1900.

fed. [We need scarcely repeat our opinion expressed in the YEAR-BOOK for 1900 that scurvy and rickets are two distinct diseases.] R. H. Gilbert¹ reports 2 cases, in 1 of which **separation of the humeral epiphysis** occurred. G. Rose² reports scurvy in a 7 months old child following a **diet of proprietary foods without any milk**. Improvement was rapid in 2 weeks on antiscorbutic diet, but diarrhea started and resulted fatally. At the autopsy, subperiosteal hemorrhage and thickening of the periosteum with new bone-formation were found over the femur. H. E. Tuley³ reports a case in which the symptoms were those of scurvy, but the child, 2½ years old, had not been on a diet calculated to produce scurvy, and the **symptoms** were also such as are **seen in purpura hæmorrhagica**. A fatal pneumonia interfered with the dietary test. L. Starr⁴ states that the disease is characterized by such a **well-marked complex of symptoms** that there ought to be no difficulty in recognizing it. The direct causal factor is the continued use of food that lacks some essential nutritive elements or presents them in a form not readily assimilable. He classes the faulty foods in the order of their potency, as follows: (1) The different proprietary infants' foods administered without the addition of cows' milk; (2) proprietary foods employed with the addition of insufficient quantities of cows' milk; (3) oatmeal or wheat gruel, barley and other farinaceæ administered with water alone or with water and insufficient cows' milk; (4) condensed milk and water; (5) sterilized milk, even when properly modified; (6) too dilute milk and cream mixtures. The author has seen 26 cases in the past 10 years, which he tabulates systematically.

Rachitis.—E. Pritchard⁵ comes to the conclusions with regard to the pathogenesis and treatment of rachitis that an **excess of lactic and similar acids** is probably the cause of the symptoms, that this excess may be generated sometimes through ingestion of too much food, often associated with an insufficient supply of oxygen. In such cases there may be no deficiency in any of the necessary elements, but the carbohydrates will be found to be in great excess, and the only treatment necessary is a change in the food to the proper proportions and amount.

L. Spillman,⁶ after a study of the bone-changes in rachitis, claims that the **primary change is the formation of new blood-vessels**. Secondary to this there occur proliferation of the cartilage cells and defective calcification and ossification. These changes occur in the periosteum as well as in the epiphyses, and the process should therefore be regarded as an osteitis, both juxtaepiphyseal and subperiosteal. In another contribution the author⁷ states that the cause of this osteitis is an **intoxication of intestinal origin**, specific to rachitis. F. Fédé and G. Finizio⁸ refer to the **rarity of fetal rachitis**, as they could find, in 475 newborn infants, clinical symptoms of rickets in but 3. Three others

¹ Pediatrics, Sept. 1, 1900.

² Scottish M. and S. Jour., vol. VII, No. 1.

³ Jour. Am. Med. Assoc., vol. XXXV, No. 20.

⁴ Phila. Med. Jour., Apr. 27, 1901.

⁵ Arch. of Ped., Feb., 1901.

⁶ Rev. Mens. des Mal. de l'Enf., Jan., 1901.

⁷ Arch. de Méd. des Enf., May, 1901.

⁸ Rev. Mens. des Mal. de l'Enf., vol. XIX, No. 3.

had craniotabes, and 4 had double genu varum, but these may be independent of rickets. The cranial bones of 6 newborn infants having clinical signs of rickets, large fontanels, and open sutures, were examined microscopically, and the changes found were not those of rickets, but merely retarded ossification.

Diabetes.—N. A. Orlow¹ reports a case of diabetes in an infant 4 months old. The symptoms were polyuria, glycosuria, polyphagia, autophagia, and furunculosis, and the child died 12 days after admission. At the autopsy, in addition to pneumonia and enteritis, there was a serous effusion in the third ventricle, which the author holds was the cause of the diabetes, making this the **first genuine case of infantile diabetes** on record. W. I. Noskow² reports a case in a boy 3½ years old, **following grip**. Coma lasted for 48 hours and death ensued. The author considers hereditary syphilis to have been at the bottom of the disease. W. E. Young³ reports a case of diabetes in an infant 6 months old. The kidneys were palpable, the urine had a specific gravity of 1030, contained 5% of sugar, a trace of albumin, and a few casts. Emaciation was rapid and the child died in an attack of pneumonia in 3 weeks. The author quotes briefly from the literature to show the great rarity of the disease in infants. L. F. W. Haas⁴ reports **diabetes in two members of one family**, a boy 5 years and a girl 9 years old. The family history was tuberculous and the boy had had an injury. The only symptom present was the glycosuria, and both patients were doing well on a moderately strict diet. In the discussion, H. Stern referred to an investigation in which he found that out of 1867 deaths from diabetes only 13 were in patients under 5 years of age and but 5 of these were in the nursing period. He is of the opinion that diabetes in children is quite different from that in adults. P. Le Gendre⁵ reports a case of **diabetes in an infant 22 months old**, terminating fatally in coma within 6 weeks. At the start the urine contained 14 grams of glucose per liter, increasing steadily to 46 grams in spite of diet and treatment with extract of liver. The family history was diabetic and gouty. L. Baumel⁶ has the distinction of reporting a **cure of diabetes** in an infant 6 months old, breast-fed and nonsyphilitic. The symptoms were polyuria, thirst, general edema, and glycosuria, with 1 gram of glucose per liter. With calcium lactophosphate and regulation of feeding the child recovered, the author deeming it possible that dentition caused the condition reflexly. Lemonnier⁷ reports the case of a girl who had been treated successfully in the first months of life for congenital syphilis. At the age of 7 years diabetes set in for 3 months, with emaciation, great thirst, glycosuria, and polyuria. Under antisyphilitic treatment by mercurial inunctions and potassium iodid recovery was complete in 4 months. The author believes that **syphilis may cause diabetes** through a lesion of the nervous system

¹ Vratich; Phila. Med. Jour., Apr. 27, 1901.

² Arch. of Ped., Mar., 1901.

³ Arch. de Méd. des Enf., Mar., 1901.

⁴ Jour. Am. Med. Assoc., vol. XXV, No. 20.

⁵ *Ibid.*

⁶ *Ibid.*

⁷ *Ibid.*

or pancreas, or through the syphilitic diathesis alone, treatment being successful in either case; or, syphilis in the parent may cause the development of diabetic dyscrasia in the child, and here treatment is unsuccessful.

Diabetes Insipidus.—O. Cozzolino¹ reports a case of polyuria in an infant 2 months old, over a liter of urine being passed daily. Recovery followed the use of valerian, iron, cod-liver oil, and coffee.

DISEASES OF THE DUCTLESS GLANDS.

Thyroid.—F. Siegert² states that there is in myxedematous idiocy a hypoplastic chondrodystrophy quite distinct from and even antagonistic to rachitic changes. Quineke³ had a cretin under observation from the age of 6 months for 3 years, during which time there was great improvement under thyroid treatment. The thyroid gland was felt to be about the size of a pea. The patient was lost sight of for some time and finally died of an enteritis, the autopsy showing total disappearance of the thyroid, so the author considers the case to have been one of **progressive atrophy of the thyroid** and not a congenital absence. In another report the author⁴ details the case of a child healthy up to the age of 15 months, when progress was arrested for 4 months, there then beginning loss of intelligence and speech, with disturbances of nutrition, especially of the teeth. Iodothyron was used, with a return to the normal. The author calls this a case of **athyreosis**, separating it from congenital cretinism and from ordinary myxedema. The permanent improvement he explains on the ground that there was somewhere an accessory thyroid which took up the work or else that the thymus acted vicariously. His theory of the origin of such cases is an **autointoxication affecting the thyroid**. Russow⁵ reports a case of cretinism in a child $2\frac{1}{2}$ years old, **improving steadily on thyroïdin** for some months, when measles set in complicated by pneumonia, with a fatal termination.

Spleen.—S. West,⁶ in a consideration of the causes of enlargements of the spleen, refers to the **so-called splenic anemia** and does not approve of the term, as the relation between the anemia and the splenic enlargement is not clear.

Thymus and Lymphatic State.—J. K. Friedjung,⁷ in reporting a case of **sudden death** in a child 6 years old, who was mildly ill with influenza and in whom at autopsy was found general enlargement of the lymphatic structures, discusses the present status of the question of thymic asthma in childhood and its relation to the so-called lymphatic state. He is of the opinion that while a few of the cases of sudden "thymus death" may be the result of pressure on the trachea or other important neighboring structures by an enlarged thymus, yet the ma-

¹ Il Policlinico, May, 1900; Med. Rec., vol. LVII, No. 22.

² Arch. de Méd. des Enf., Dec., 1900.

⁴ *Ibid.*, Dec. 13, 1900.

⁶ Brit. Med. Jour., No. 2070, 1900.

³ Deut. med. Woch., Nov. 29, 1900.

⁵ Med. Woch., 1900, No. 30.

⁷ Arch. f. Kinderh., Bd. XXIX, II. 5 u. 6.

jority are due to the general lymphatic state. Laryngospasm is not a special feature connected with hypertrophy of the thymus, but when it occurs in such lymphatic children, the condition may be dangerous. While laryngismus stridulus is most commonly the result of an enlarged thymus, it may be found in uremia or may be purely nervous.

Adrenals.—S. M. Hamill¹ reports 3 cases of hemorrhage into the suprarenal capsule, one infant dying on the fourth day after birth, the second on the ninth, and the third on the fifteenth. The author gives a careful review of the literature, collecting 91 cases, and discusses the etiology, pathology, and diagnosis at length. When the infant is still-born, the hemorrhage is the result of the compression during labor. In infants living a few days, difficult labor may be the cause, but the majority are the result of infection, while all dying after the tenth day may be considered undoubtedly infectious. In one of the author's cases culture of the heart's blood gave a bacillus resembling the colon bacillus. Cultures from the other cases remained sterile.

DISEASES OF THE GENITOURINARY SYSTEM.

C. Douglas² discusses **infantile nephritis**, which is less common than nephritis in childhood. Many cases present very slight symptoms, probably due to the diuretic action of the milk. An attack of nephritis is probably more thoroughly repaired in infancy than later. The author reports 4 cases at the ages of 5, 6, 10, and 14 months, the second patient dying in 2 months.

R. G. Freeman³ states that **acute nephritis following influenza** is more common in children than in adults, being rare in both, but when it does occur, taking the acute hemorrhagic type and having a good prognosis. He reports a case in a boy 4 years old. In the discussion, Fruitnight, Dorning, Jennings, and Churchill agreed that nephritis is rare in influenza. [In our experience this would seem to depend on the type of the epidemic of this protean disease. Certainly, in the winter of 1900 to 1901 influenza showed a great tendency to produce for a few days albumin, casts, and cells, in many of the Philadelphia cases.]

Gangee⁴ reports a case of **cystinuria** in a boy 12 years old, with the formation of a vesical calculus. This was removed by suprapubic cystotomy and weighed 8 grains. The author refers to the theory that cystinuria depends on **abnormal decomposition of proteids** in the intestines by certain specific microorganisms.

L. Fischer⁵ reviews the subject of **pyelonephritis** in children and reports a case in a girl 12½ years old, probably depending on measles and chickenpox at the age of 4 years. There were emaciation, constipation, fever, abdominal pain, and a tumor in the right side. The urine

¹ Arch. of Ped., Feb., 1901.

³ Arch. of Ped., Oct., 1900.

² Phys. and Surg., vol. XXII, No. 5.

⁴ Lancet, No. 4042.

⁵ Arch. of Ped., Jan., 1901.

contained albumin, casts, and blood, but no pus. Nephrectomy was done, the kidney showing chronic interstitial nephritis with miliary abscesses and a greatly distended pus sac in place of the pelvis. The child was restored to apparent health.

J. Hallé¹ reports a **perinephritic abscess** in a girl 8 years old following traumatism. Recovery followed surgical intervention.

H. B. Sheffield² refers to the frequency of **vulvovaginitis in children** and the indifference exhibited by the profession toward it. The diagnosis is not complete without a microscopic examination of the discharge, the **gonococcus** being found in many cases. For treatment protargol is recommended, a 1% to 2% solution being used after a cleansing irrigation with a weak alkaline solution. If the urethra is inflamed, a crayon containing protargol, iodoform, Peruvian balsam, and belladonna should be inserted once or twice a day. Absence of the gonococcus on repeated examination is an essential criterion before recovery can be pronounced complete.

I. A. Abt³ emphasizes the importance of congenital origin and congenital predisposition in the **causation of floating kidney** in children. He reports 5 cases, the right kidney being movable in 4.

DISEASES OF THE NERVOUS SYSTEM.

Kernig's Sign.—P. Roglet⁴ has investigated Kernig's sign (the inability to straighten the legs when the patient is in a sitting posture) and finds it of value to confirm the diagnosis of meningitis, as it is present in 85% of cases. It is not pathognomonic and its absence has no significance. It is more common in cerebrospinal than in tuberculous meningitis, rarely appearing at the start.

Babinski's Reflex.—A. Muggia⁵ discusses the Babinski great-toe reflex (the extension, instead of flexion, when the sole is tickled) in infants, and concludes that it has no significance up to the age of 6 months. After that period it may be present in rickets without any nervous disorder. It may serve to differentiate meningitis from the meningismus of infectious diseases, infantile hemiplegia from neuritis or poliomyelitis, and organic disease from hysteria. In cerebellar tumor its weakness, and in coxitis and muscular dystrophies its absence, will aid in excluding other conditions. In estimating its value individual variations must be constantly borne in mind.

Lumbar Puncture.—F. Gumprecht⁶ mentions some of the dangers of lumbar puncture, one being breaking of the needle by movement on the part of the patient or the physician, the other being sudden death during or shortly after withdrawal of the fluid. He reports 2 such cases, autopsies showing cerebral tumors. [The existence of tumors, especially near the base, has been shown to be a contraindica-

¹ Arch. de Méd. des Enf., Apr., 1901.

² N. Y. Med. Jour., No. 1131.

³ Jour. Am. Med. Assoc., Apr. 27, 1901.

⁴ Thèse de Paris; Arch. de Méd. des Enf., Jan., 1901.

⁵ La Pediatria, vol. VIII, No. 10.

⁶ Deut. med. Woch., June 14, 1900.

tion to lumbar puncture, the fluiding acting as a support to the tumor, the latter tending to sink, after withdrawal of the fluid, toward the foramen magnum, like a stopper in a bottle, and causing death by pressure on the vital centers.] Alfred Hand, Jr.,¹ reviews the literature of the **diagnostic and therapeutic value** of lumbar puncture, concluding that positive conclusions can be drawn only when positive results are obtained from the procedure, but that usually this furnishes information of great diagnostic value. Therapeutically it seems to influence favorably the course of epidemic cerebrospinal meningitis, it promotes comfort in tuberculous meningitis, and when there is excessive pressure from any cause it favors recovery by removing a condition immediately dangerous to life.

Netter² calls attention to the **positiveness** with which **lumbar puncture makes the diagnosis of meningitis**, and the proof that it gives that cases do recover. It has of course been granted that the serous and serofibrinous cases may recover, but he reports 11 cases of purulent meningitis due to the Weichselbaum-Jaeger diplococcus, in which lumbar puncture was done from 1 to 10 times, 7 of the patients recovering. The good results were attributed especially to warm baths (38° to 40° C.) every 3 or 4 hours for 20 or 30 minutes at a time. H. Koplik³ reports on the results of **repeated lumbar punctures** in 5 cases of **meningitis** due to the meningococcus. Four patients recovered, and 1, a child of 8 months, died in convulsions. The indications for the procedure were headache, somnolence, delirium, chills, fever, increase in opisthotonos, increase in coma. If improvement followed for a time and then the indications reappeared, the puncture was repeated; if the improvement was permanent, tapping was not repeated. The relief afforded seemed to be mainly in the diminution of pain, with the lessening of the toxemia and of those symptoms due to pressure. The author is of the opinion that benefit in the long run cannot fail to follow the removal of fluid containing bacteria and toxic products, and that while it is too soon to say how far prognosis can be influenced, yet the operation will undoubtedly rank with pleural aspiration as a curative method. Widal, Sicard, and Ravaut⁴ refer to the **importance** which the presence of **lymphocytes** in cerebrospinal fluid possesses as **indicating a tuberculous meningitis**, other forms of meningitis showing an abundance of the polynuclear leukocytes.

Meningitis.—H. Thursfield⁵ reports 17 cases of **posterior basic meningitis** with 2 recoveries, the ages of the patients varying from 3 months to 4 years. In 8 of the 9 autopsies bacteriologic examination showed an intracellular diplococcus of feeble vitality. The author observed a peculiar gray discoloration of the upper lid, which he considers to be characteristic of the disease.

Aphasia occurring in children is discussed by M. F. Bernheim⁶ in

¹ Am. Jour. Med. Sci., Oct., 1900.

² La Presse Méd., 1900, No. 39.

³ Med. News, Mar. 23, 1901.

⁴ La Presse Méd., vol. LIII, No. 8.

⁵ Lancet, No. 4042.

⁶ Gaz. des Hôp., Jan., 1900; Arch. de Méd. des Enf., Feb., 1901.

all of its phases and the literature is reviewed. V. Trischitta ¹ treats of it as a complication of the infectious diseases.

Astasia-abasia of hysteric origin in 2 children is reported by J. Comby. ²

Convulsions.—W. N. Bullard and C. W. Townsend ³ found that 1 % of patients applying at the Boston Children's Hospital came for convulsions ; that 10 % of those between 5 and 12 years of age gave a history of convulsions ; that some cases with a manifest reflex cause developed true epilepsy, while others without apparent cause would suddenly recover, at least for a long time ; and that some children who have had convulsions may become strong and free from nervous tendencies in after life. A. R. Lapham ⁴ reports a **case of convulsions following a fall**, in a girl 3 years old, the attacks occurring with great regularity every hour. Treatment in the hospital with diet, bromids, trional, and codein reduced the number to 1 a day for a time, but with a febrile coryza they increased again so that the total number of convulsions during 22 days in the hospital was 387. The child was later removed to the country and given a careful diet without any medication and the convulsions ceased, without any return up to the present.

Spasmus Nutans.—D. J. M. Miller ⁵ collects from the literature 78 cases of **head-nodding and head-rotation**, reporting 3 cases which occurred in infants 5, 12, and 8 months old, all decidedly rachitic. The author refers to Raudnitz's **theory of eye-strain** in the etiology, and states that he was unable to find evidence of this in his cases. He emphasizes the importance of rickets as being at the bottom of many cases, but states that the etiology is undoubtedly varied and the condition functional, the proper treatment being hygienic and dietetic rather than medicinal with the bromids as is so often recommended. J. Thomson ⁶ discusses the etiology of the condition, pointing out that three-fourths of the cases occur between the fourth and twelfth months, none being reported after the twentieth. There is a slight predisposition on the part of the female sex, and neuropathic stock also favors its development. Intelligence is usually unimpaired. Some cases follow acute illnesses and the majority occur in winter in rachitic children living in dark houses. The author ⁷ describes the **nystagmus associated with the head movements**, showing that the horizontal movements of the eyeballs are convergent and the rotary are more like circumduction than rotation. The nystagmus is often unilateral and may be vertical or rotary instead of being nearly always horizontal. One variety of movements may exist in one eye and a different kind in the other. J. H. Jopson ⁸ reports a case of **head-nodding** with nystagmus in an infant 11 months old, associated also **with spasmodic torticollis**.

Chorea.—A. A. Eshner ⁹ discusses the **differential diagnosis** of chorea from the disorders simulating it, including posthemiplegic chorea,

¹ Gaz. degli Ospedali e delle Cliniche, 1900.

² Arch. de Méd. des Enf., May, 1901.

⁴ Arch. of Ped., Apr., 1901.

⁶ Scottish M. and S. Jour., July, 1900.

⁸ Arch. of Ped., Apr., 1901.

³ Boston M. and S. Jour., Mar. 7, 1901.

⁵ Arch. of Ped., Aug., 1900.

⁷ Brit. Med. Jour., Mar. 30, 1901.

⁹ Jour. Am. Med. Assoc., July, 1900.

athetosis, habit-chorea, and other conditions. J. Hallé and G. Langevin¹ report a **fatal case** of chorea in a girl of 10 years. Congestion of the organs was found at the autopsy, and a culture from the blood during life gave streptococci in pure growth, an infection which the authors consider secondary to the chorea.

Hysteria.—C. Herman² gives a brief discussion of hysteria in children, and reports the case of a boy, 11 years old, with hysteric laryngeal attacks in which there was a long, deep inspiration, with spasm of the glottis, producing a loud, shrill sound.

Neuroses.—O. J. Kaufmann³ holds that in the **commoner neuroses** of childhood, such as chorea, enuresis, migraine, tetany, dreaming, nightmare, and epilepsy, one of the most important points in the etiology is an **autointoxication** from gastrointestinal disorder. Treatment, therefore, should be largely directed to regulation of the diet, with meat not more than once a day, and the use of laxatives and intestinal antiseptics, the author favoring charcoal and soda sulphocarbolate. I. Herbsmann⁴ recommends massage of the neck of the bladder, by a finger introduced into the rectum, for cases of **obstinate enuresis**, and reports cures in cases of as long standing as 15 and 18 years.

Tumors.—V. Joukovsky⁵ reports a unique case of hydrocephalus and congenital **tumor of the pineal gland** in an infant, a marked symptom during the few days of life being a subnormal temperature (30.2° C.) with lethargy. The tumor was cystic. S. R. Ketcham and L. C. Peter⁶ report a case of **cerebellar tumor** in a boy 7 years old, with nystagmus noticed soon after birth, followed in a few years by a titubating gait, static ataxia, incoordination of the upper extremities, headache, vomiting, and choked disc. The age of onset, the presence of optic atrophy (the right eye being totally blind), and the absence of speech-disturbance tend to exclude hereditary ataxia. The authors believe that the growth is probably a glioma. L. R. Morris⁷ reports a case of **cerebellar tumor** in a girl 6 years old. Periods of apparent health would frequently alternate with grave symptoms, from early childhood. A chronic appendicitis was held responsible for a time for all the symptoms, but operation cured this and there then developed headache, vomiting, stiffness of the neck, strabismus, anisocoria, and tremor of the hands. Ataxia was absent. Clonic convulsions of the right leg and mental apathy were soon followed by stupor and death from respiratory failure. The diagnosis of median cerebellar tumor with hydrops ventriculi was confirmed by autopsy, except that the tumor, a **round-celled sarcoma** the size of an egg, was not in the substance of the cerebellum, but was pressing against its anterior surface.

Infantile Paralysis.—Placzek⁸ examined the spinal cord of a child 4 years old, who had died of infantile paralysis, and found that the **primary changes** seemed to be in the **blood-vessels and lymph-**

¹ Arch. de Méd. des Enf., Aug., 1900.

³ Lancet, No. 4011.

⁵ Rev. Mens. des Mal. de l'Enf., May, 1901.

⁷ Médecine, vol. VI, No. 7.

² Arch. of Ped., Sept., 1900.

⁴ Med. Woch., No. 37, 1900.

⁶ Arch. of Ped., Mar., 1901.

⁸ Med. Woch., No. 21, 1901.

spaces rather than in the ganglion cells, and he believes that the lesion is of primary vascular origin.

Hemiplegia.—E. Weill and Gallavardin¹ report a case of **congenital cerebral infantile hemiplegia with false porencephaly**. The patient was a girl 13 years old, who died of a diffuse interstitial myocarditis with mitral regurgitation. In spite of the hemiplegia, which was first noted at the age of 2 months, the child learned to walk and was not idiotic. At the autopsy a cyst was found in the left hemisphere containing about an ounce of clear fluid, and probably being the result of some intrauterine pathologic process not a malformation, and therefore not being a true porencephaly. There was also sclerosis of the crossed pyramidal tract with agenesis of the direct pyramidal tract.

Infantile Amaurotic Family Idiocy.—J. H. Claiborne, Jr.,² reviews briefly the literature on this subject and reports a case presenting many of the symptoms, the autopsy showing general tuberculosis with a **tuberculous tumor of the corpora quadrigemina**. The author agrees with Hirsch in believing that the disease is acquired and does not consist of an arrest of development.

Tetany.—J. L. Morse³ reports 7 cases of tetany in infancy. He states that tetany is a **nosologic entity rather than a distinct disease**, and that it depends on many causes. Digestive disturbances are present in the great majority of cases. Rickets is not necessarily marked. Craniotabes was absent in all, and the influence of rickets is probably indirect. In 1 case distention of the gums by teeth seemed to be the only cause, and yet this condition continued after the recovery. Influenza seemed to cause 1 case, as did syphilis. The treatment, therefore, should be that of the cause, symptomatic treatment being subsidiary.

Spinal Muscular Atrophy.—J. Hoffmann⁴ describes a third type of **hereditary spinal muscular atrophy** occurring in early infancy. He separates it from pseudohypertrophic muscular atrophy and from progressive neural muscular atrophy. It begins in the first year of life in children of healthy parentage, the legs being moved at the hip-joints less and less. The spread of the paralysis is slow, over months, until all the voluntary muscles are affected, except those of the cranial nerves, and death occurs in from 1 to 4 years. Autopsy shows symmetric degeneration of the peripheral neurons of all the nerves below the hypoglossal, with widespread muscular atrophy.

Landry's Disease.—L. A. Rowden⁵ reports a case of **descending Landry's paralysis** in a child 10 years old. The muscles of the neck were first attacked, then those of the arms, forearms, chest, and legs, with no impairment of sensation and no loss of control of the sphincters. The mind remained clear up to death, which ensued in 4 days.

Exophthalmic Goiter.—Zuber⁶ reports a case in a girl 13 years old, the onset being with goiter and rapid emaciation, followed by tachycardia, tremor, and exophthalmos. Seven months after the onset there

¹ Arch. de Méd. des Enf., Mar., 1901.

² Pediatrics, July 1, 1901.

³ Phila. Med. Jour., Jan. 5, 1901.

⁴ Münch. med. Woch., Nov. 27, 1900.

⁵ Brit. Med. Jour., May 4, 1901.

⁶ Arch. de Méd. des Enf., Oct., 1900.

occurred an attack of rheumatism, complicated by pericarditis and chorea. Recovery occurred from all these conditions except the tachycardia and hypertrophy of the left lobe of the thyroid, and there had been no relapse for 2 years. Treatment consisted in applying the faradic current to the neck and eyes, according to Vigouroux's method. The author refers to the literature, which comprises 47 cases in children, and he analyzes them with reference to the various symptoms.

DISEASES OF THE MUSCLES.

T. A. Martin¹ reports a case of **pseudohypertrophic muscular paralysis** in a boy 5 years old, the disease first being noticed after an attack of bronchopneumonia.

C. Hoehsinger² discusses **myotonia in infants** and its relation to tetany, insisting, with Henoeh and Strümpell, that they are distinct conditions. In myotonia there is no increased excitability of the muscles and nerves to mechanical or galvanic stimulation as in tetany, and the muscular spasm is persistent and painless, rather than intermittent and painful as in tetany. Myotonia occurs usually in the first 3 months of life, while tetany is most frequent from the fourth to the twentieth month. The most frequent causes of myotonia are gastrointestinal disturbances, congenital syphilis, and in some cases skin-conditions like dermatitis, eczema, or burns. The author considers this myotonia to be an exaggeration of the physiologic hypertonia in newborn infants. He describes three grades of it; one, a mild degree of increase of the physiologic hypertonia, which depends on slight digestive disturbance; the second is a persistent spastic myotonia, with symmetric spasms of the flexors of the hands and feet, which may persist for months; the third degree resembles tetanus with the myotonia involving the trunk- and neck-muscles, and the author believes that many of the reported recoveries from chronic tetanus have been cases of this pseudotetanus, which can be distinguished from true tetanus by the absence of increased excitability of the muscles and nerves. The changes observed by Marchi and Nissl in the anterior roots and cells of the anterior horns of the cord in children dead of sepsis or enteritis are held by the author to be the anatomic basis of these degrees of myotonia.

THERAPEUTICS AND TOXICOLOGY.

K. Gregor³ discusses the present **indications for venesection** and states that he has seen it do good even in infants from 4 to 8 months old. He has used it in cases of intracranial congestion and in the advancing stage of pneumonia, where he believes it does more good than digitalis. He recommends the withdrawal of one-fifteenth or one-sixteenth of the entire mass of blood in the body.

¹ St. Louis Courier of Med., No. 138.

² Wien. med. Woch., No. 7-12, 1900.

³ Jahrb. f. Kinderh., Bd. LII, H. 1.

Garnier and Simon ¹ report a case of **lead-poisoning** in a boy 8 years old, who was the subject of obstinate enteritis. Absolute milk-diet seemed to make him worse, so he was put on a diet of vegetable purees, eggs, and chopped meat. Recovery was rapid, but at the end of a month he suddenly developed a **yellowish hue resembling jaundice**; but it was easily seen that it was hematogenous. Urobilin and indican were increased in the urine, and all causes of hematogenous jaundice could be excluded except poisoning. After searching for a few days the **metal meat-chopper** was located as the probable source, and its use was discontinued, with a return to health in a few weeks. The chopper, on analysis, was found to contain 26 centigrams of lead in 7 grams. The case is interesting as presenting none of the usual signs of lead-poisoning, the action seeming to be entirely on the liver.

A. Baines ² reports 2 **fatal cases of lead-poisoning** in boys 3 and 6 years old, each case presenting colic, constipation, and then repeated convulsions and coma, with fever. The source of the lead was the **burning of barrel staves**, impregnated with white lead, in the fire over which the meals were cooked.

C. E. Stokes ³ reports 2 cases of **poisoning with bromoform**, given for pertussis. Failure to shake the bottle had allowed some of the drug to settle to the bottom, and the last dose for each child probably contained 3 or 4 minims of pure bromoform. Artificial respiration was necessary for 1½ hours in one child.

MISCELLANEOUS.

Temperature.—W. M. Donald ⁴ conducted studies on the **daily temperature range** in 39 healthy children for 2 weeks, which indicated that the normal temperature in children is as a rule higher than in adults, is very unstable and variable, and that some children have a tendency to maintain a constantly high temperature, which would be considered pyrexia in others.

Duhring's Disease.—W. S. Gottheil ⁵ reports 2 cases of dermatitis herpetiformis, the patients being a girl of 9 years and a boy of 12 years. Its comparative rarity in childhood the author attributes to mistaken diagnoses. Treatment is unsatisfactory.

Pemphigus Neonatorum.—W. J. Hodgson ⁶ reports a case in which the bullas appeared on the third day and recovery was complete in 3 weeks. Syphilis did not seem to be the cause.

A. Johanessen ⁷ gives an interesting series of figures in discussing **mortality in Norway of infants** under 1 year. He shows Norway to have the **lowest death-rate** (9.76 per 100,000) of any European country. The alimentary diseases play a large part in the mortality, but curiously show no decided increase in the summer months.

¹ Arch. de Méd. des Enf., Jan., 1901.

² Arch. of Ped., Sept., 1900.

³ Brit. Med. Jour., No. 2056.

⁴ Arch. of Ped., Mar., 1901.

⁵ Arch. of Ped., June, 1901.

⁶ Lancet, Mar. 30, 1901.

⁷ Rev. Mens. des Mal. de l'Enf., Jan., 1901.

PATHOLOGY AND BACTERIOLOGY.

By DAVID RIESMAN, M.D., AND A. O. J. KELLY, M.D.,
OF PHILADELPHIA.

TUBERCULOSIS.

The Comparative Virulence of the Tubercle Bacillus from Human and Bovine Sources.—Ravenel,¹ from an exhaustive study of the question, concludes: (1) That the tubercle bacillus from bovine sources has in culture fairly constant and persistent peculiarities of growth and morphology, by which it may tentatively be differentiated from that ordinarily found in man; (2) that cultures from the two sources differ markedly in pathogenic power, affording further means of differentiation, the bovine bacillus being very much more active than the human for all species of experimental animals tested, with the possible exception of swine, which are highly susceptible to both; (3) that tuberculous material from cattle and from man corresponds closely in comparative pathogenic power to pure cultures of the tubercle bacillus from the two sources for all animals tested; and (4) that it is a fair assumption from the evidence at hand, and in the absence of evidence to the contrary, that the bovine tubercle bacillus has a high degree of pathogenic power for man also, which is especially manifest in the early years of life. Ravenel² also reports 3 cases of tuberculous of the skin of man due to inoculation from bovine sources.

The Occurrence of Tubercle Bacilli in the Blood and in the Semen in Cases of Experimental Localized Tuberculosis.—Mayer³ refers to the demonstration by Hauser that in localized tuberculosis a bacillary infection of the fetus may occur, and then gives the results of his investigation as to whether in beginning or latent tuberculosis tubercle bacilli are present in the blood in such large numbers that an early infection of the testicles and discharge of tubercle bacilli with the semen are possible. Small portions of tuberculous lungs or glands were implanted into the pleural cavities of healthy male guinea-pigs. At periods varying from 12 days to 3 weeks the blood and the semen of these animals were withdrawn and injected into the peritoneal cavities of other guinea-pigs, which were killed after the lapse of 3 months. In 9 of the 12 animals the tuberculosis remained localized to the pleura; in 3 a generalized tuberculosis developed. The blood of 4 and the

¹ Univ. of Penna. Med. Bull., XIV, 238, 1901; Lancet, Aug. 17 and 19, 1901.

² Phila. Med. Jour., July 21, 1900.

³ Inaug. Diss., Erlangen, 1900; Centralbl. f. Bakt., etc., XXVIII, 395, 1900.

semen of 2 of the 9 animals with localized tuberculosis were found to be infected with tubercle bacilli, whereas the blood of 3 and the semen of 2 of the 3 animals with generalized tuberculosis were found infected. The fact that in the majority of cases the semen was free from bacilli is held to be an argument against the bacillary hereditary transmission of tuberculosis.

Variation in Virulence of the Tubercle Bacillus in Man.—Lartigau,¹ as a result of study of the variation in virulence of the tubercle bacillus in man, and the relation of virulence to the clinical and morphologic type of tuberculosis, concludes: (1) Inoculations of tubercle bacilli of different origins in fixed amounts into animals—rabbits and guinea-pigs—induce various degrees of tissue-reaction—that is, tuberculosis. (2) Inoculation of varying amounts of the same culture is followed by marked difference in the distribution of the tuberculous lesions. (3) The differences in the number and distribution of the lesions found, with the acuteness of the process and extent of tissue-reaction, may be taken as indicating variations in virulence when the infections have been induced under similar conditions in the series of animals compared. (4) Subcutaneous inoculations of even 20 milligrams of a pure culture of tubercle bacilli of feeble virulence often induce no lesion or scarcely more than a localized tuberculosis at the seat of inoculation in the guinea-pigs and rabbits. (5) Very virulent cultures inoculated subcutaneously in amounts of less than 1 milligram may induce general tuberculosis in a rabbit in a very short time as compared with those of lesser virulence. (6) No relation could be observed between the morphology and the virulence of the tubercle bacilli investigated. (7) Tubercle bacilli of great virulence were, on the whole, more difficult of cultivation and the growths scantier and shorter lived than was the case in tubercle bacilli of less virulence. (8) Tubercle bacilli of widely different virulence may be present in any one of the various human tuberculous lesions—tuberculous lymphadenitis, pulmonary, bone, and joint tuberculosis. (9) In so-called scrofulous lymphadenitis the tubercle bacilli are generally of low virulence; sometimes, however, bacilli of great virulence may be present. (10) When tubercle bacilli of great virulence are present in lymphadenitis, the tuberculous process is apt to spread to other tissues. (11) The tubercle bacilli present in pulmonary tuberculosis with ulceration may be of feeble virulence, especially in those cases in which the clinical history indicates a slowly progressing lesion. (12) In acute miliary tuberculosis the tubercle bacilli may be of very great virulence. (13) So-called healed tuberculosis of the lung may contain virulent or attenuated tubercle bacilli. (14) In an individual already affected with a lesion containing tubercle bacilli of slight virulence there may occur a fresh infection with extremely virulent tubercle bacilli. (15) Chronic tuberculous bone lesions may contain tubercle bacilli both of low virulence and of high virulence. (16) Variations in the virulence among human tubercle bacilli may possibly sometimes depend, like many other qualities among tubercle bacilli, on

¹ Jour. of Med. Research, new series, 1, 156, 1901.

peculiarities inherited through serial transmissions in other than human hosts.

The Presence of Virulent Tubercle Bacilli in the Healthy Nasal Cavity of Healthy Persons.—N. W. Jones¹ finds that dust is an important and dangerous factor, especially to those in attendance upon tuberculous patients. Dried tuberculous sputum is the most dangerous, the nasal mucus being less so for obvious reasons. Dust laden with tubercle bacilli and blown into the faces of guinea-pigs, especially when strong currents were used, produced tuberculosis in many of them. Fine droplets of mucus, laden with tubercle bacilli, when coughed or sneezed out, play an important role in the dissemination of the organism. In such cases repeated approximation to coughing patients within a distance of 1 meter must take place. This may occur easily in the case of attendants, in factories, counting-rooms, etc. The nasal cavities of individuals themselves nontuberculous, but in constant attendance upon tuberculous patients, contain virulent bacilli. Twenty-nine experiments were made upon hospital attendants, internes, and patients suffering with chronic maladies other than tuberculosis. The contents of the nasal cavity were removed with sterile cotton swabs into sterile bouillon and the mixture injected into guinea-pigs intraperitoneally. The result was as follows: Seven animals died within a few days of septicemia or acute peritonitis; 9 animals died, in from 12 to 33 days, of tuberculosis of the omentum, mesenteric glands, spleen, and occasionally the lungs and liver; the remaining 13 animals died from causes nontuberculous. These tests show bacilli present in 40.9% of all persons experimented on, the 7 animals dead of septicemia or peritonitis having been deducted from the total number because of their early death. To determine if tubercle bacilli were to be found in the nasal cavities of people following the ordinary vocations of life, Jones made cultures of the nasal contents of a number of healthy individuals who were in good physical health and not haunTERS of laboratories and clinics. He injected these cultures into the peritoneal cavity of 31 guinea-pigs, with the following result: One died within a few hours of septicemia; another in 3 days of acute peritonitis; 22 died from acute pulmonic lesions of unknown origin (no microorganisms could be isolated from the lungs); 3 died of staphylococcus infection with multiple abscesses of spleen and liver; 1 was drowned; and 3 died of tuberculosis on the fourteenth, the twenty-sixth, and the fifty-ninth day respectively. Thus tuberculosis developed in 10.3% of the cases. The cultures in these cases were derived respectively from a second-hand furniture dealer and two students.

Destruction of the Joint Cartilages in Tuberculosis and in Suppuration.—Heile,² having studied the changes that occur in the joint cartilages in tuberculosis, believes that beginning inflammation increases the physiologic activity and growth of the cartilage, and that more severe inflammations lead to destruction of the cartilage either as a result of the direct action of caseous and suppurative poisons, or

¹ Med. Rec., Aug. 25, 1900.

² Virchow's Arch., CLXIII, 265, 1901.

through immigration of leukocytes and connective-tissue cells. The active agents in the destruction of the cartilages are the toxins, which may or may not be aided by invading cells; the cartilage cells and the matrix are active only in so far as through disintegration and degenerative processes they may assist in their own destruction. Transformation of cartilage cells into young forms, or connective-tissue cells, or lymphocytes, or leukocytes, or erythrocytes, could not be observed.

Muscle Degeneration in Chronic Tuberculosis.—Schmieden¹ reports an interesting case of complicated degeneration of the rectus abdominalis in a man, aged 25 years, who died of chronic tuberculosis of the lungs, pleura, pericardium, etc. The lesions of the muscle were simple atrophy, fatty degeneration, vacuolar degeneration, and waxy degeneration. With regard to the waxy degeneration, it is pointed out that it is a degeneration that occurs in acute infective diseases, especially typhoid fever, but also in typhus fever, variola, scarlatina, uremia, acute miliary tuberculosis, etc. The interest in the case reported attaches to the fact that the degeneration is observed in a case of chronic tuberculosis affecting especially the serous membranes. It is presumed that the different degenerations observed represent the results of the action of the irritant and the only partially successful efforts on the part of nature to eliminate degenerated tissue and to replace it with newly regenerated tissue.

The Piscian Tubercle Bacillus and Tuberculosis of the Frog Due to This Organism.—*Bacillus tuberculosis piscium* was discovered in the carp by Bataillon, Dubard, and Terre in 1897. It resembles the avian bacillus, but differs from it in not producing tuberculosis in guinea-pigs or rabbits and in growing at the ordinary temperature. Its other properties place it at the side of the human and avian tubercle bacilli. Ledoux-Lebard² has produced lesions in the frog with the organism, which resemble those of the tubercle bacillus of Koch. The temperature had great influence upon the development of the disease; the higher it was kept, the more rapid was the progress. The histologic changes, which differ somewhat from those of ordinary tuberculosis, are described. In the liver, peculiar pigmentary cells appear, which, while ordinarily not participating in the development of the tubercle, sometimes seem to appear in large numbers, as if to reinforce the action of the other cells.

New Technic for Staining Tubercle Bacillus.—Rosenberger³ recommends the following method for the staining of tubercle bacilli in tissue, sputum, and urine: The tissue is stained with carbol-fuchsin for from 5 to 10 minutes, washed with water and a mixture of sweet spirits of niter, and either methylene-blue, malachite green, Bismarck brown, or gentian violet applied for 2 minutes. If now, after washing in water, the color does not show, the solution is reapplied. Sweet spirits of niter is used as a bleaching agent instead of sulphuric acid. It is

¹ Virchow's Arch., CLXI, 410, 1900.

² Ann. de l'Institut Pasteur, Aug., 1900, p. 535.

³ Jour. of Applied Microscopy, June, 1900.

especially applicable to old sputum and urine containing much granular debris, as it dissolves the fatty granular particles and leaves a clear, well-defined surface behind. The smegma bacillus is decolorized by it. In staining tissue counterstains should be used for 5 minutes.

SYPHILIS.

Isolation of a Bacillus from the Blood of Syphilitic Patients.

—Lille and Jullien¹ report the successful isolation of a bacillus from the blood of syphilitic patients. The blood which was withdrawn from the arm revealed the characteristic refractile bodies that heretofore have been described and variously interpreted. Believing that the negative result of previous cultural researches was due to the presence in the coagulated blood of a bactericidal alexin, they used blood plasma separated from the serum, and also fluid obtained by blisters, said to be alexin-free. Inoculation of this on ordinary media almost invariably resulted in a growth of a polymorphic, short or thread-like bacillus. Inoculated into guinea-pigs the bacillus produces locally an indurated ulcer and enlargement of the nearest lymphatics. In no case was the bacillus found in the cadaver. The blood of syphilitic patients, added to a culture 3 days old, causes agglutination of the bacilli, a phenomenon not caused by normal serum. Injected into animals already affected with syphilis, the bacillus produces no effect. The blood of an inoculated rabbit being separated into the plasma and serum and inoculated, growths were obtained from the plasma, but not from the serum—an observation tending to support the theory of an alexin in the serum. It is believed that this alexin is fixed by the bacillus when the bacillus is injected into animals already inoculated with the syphilitic virus. [In view of the not infrequent discovery of the bacterial cause of syphilis, the results of such investigations are not to be accepted without abundant confirmation.]

LEPROSY.

The Bacteriology of Leprosy.—Barannikow,² as a result of his investigating a number of leprosy nodules, states that in these nodules there occur bacteria in a multiplicity of forms varying from the simplest to the most complex, and that in using a double stain (with decolorization) most of the bacteria reveal themselves as acid-proof; a few, however, take the second stain, but show a mixed tint. To obtain the best results it is necessary to have the histologic material and the stains as sterile as possible. In such preparations special attention should be directed to the fine network consisting of delicate and slightly staining bacteria that surround ring-shaped or spheroidal formations. From these should be distinguished somewhat similar formations consisting of refractile chain forms that do not stain by the methods given, but form a homogeneous mass. Of special interest also are the staphylococcus-like

¹ Bull. de l'Acad. de Méd. de Paris, July 2, 1901.

² Centralbl. f. Bakt., XXIX, 781, 1901.

forms which are to be found in the subepidermal spaces and which appear to play a role in the histogenesis and bacteriogenesis of leprosy. The author believes it possible to follow the bacteria in their different stages of development and assumption of pleomorphism.

The Culture of the *Lepa* Bacillus.—By using a culture medium prepared from the human placenta, Kedrowski¹ succeeded in cultivating from leprous nodules an organism which, he thinks, is the *lepra* bacillus. He classes this bacillus, which Babes has placed in the group of the *Diphtheridae*, with the branching bacteria—the streptothrix, cladothrix, actinomyces, etc. In artificial cultures the *lepra* bacillus only rarely preserves its acid resistance; usually this resistance is much diminished. The cultivation succeeds very easily in some cases; in others, scarcely at all. [The proof that the organisms cultivated were actually the bacilli of leprosy is entirely inadequate. Animal experiments are necessary to determine this important question.]

Actinomycosis.—A study of actinomycosis leads Silberschmidt² to the following conclusions: (1) The belief that actinomycosis is a specific disease produced by a single ray fungus cannot longer be entertained. A variety of organisms are capable of producing the typical disease. (2) The “*Drusen*” are not always macroscopically demonstrable. Whether clubbed or not, they represent colonies that can be formed by various organisms in the body. (3) The microscopic demonstration of the “*Drusen*” shows the presence of the organisms, but is not sufficient for a diagnosis of the latter. (4) To determine the causative agent, cultures are necessary. Ordinary aerobic and anaerobic agar and bouillon cultures suffice. (5) Mixed infections are not the rule in actinomycosis in man. (6) In the present state of our knowledge a differentiation between actinomycosis and pseudoactinomycosis is not possible. (7) The majority of organisms found in actinomycosis belong to the class of actinomycetes (streptothrices). Several subclasses can be recognized in this large class.

TYPHOID FEVER.

The Significance of *Bacillus Coli Communis* in Drinking-water.—Linsley and Stone³ consider it necessary to make bacteriologic examinations of drinking-water to determine whether the water has been polluted with sewage, and in case there are many bacteria present, whence they are probably derived. *Bacillus coli communis* is the organism most often isolated, and its presence is to them undeniable evidence of sewage pollution. In 509 specimens of water which they examined, 56 were found to contain colon bacilli, giving every typical reaction, while the bacilli from 9 others were only partly typical in reaction. Bacteriologic examination showed the presence of colon bacilli in 78.

¹ Zeit. f. Hyg. u. Infektionskrankh., XXXVII, 1, 1901, S. 52.

² Zeit. f. Hyg. u. Infektionskrankh., XXXVII, 3, 1901, S. 345.

³ Med. Rec., N. Y., Sept. 1, 1900.

while chemie research condemned only 31, thus proving the failure of chemie methods as compared with bacteriologic. The colon bacillus indicates recent surface contamination. Should a well give chemie evidence of sewage without the bacteriologic, the chances are that pollution is old or from remote ground filtration, and is therefore harmless. *Bacillus coli communis* may be the etiologic factor in many diseases, as cystitis, nephritis, meningitis, septicemia, etc., and is usually the infective agent in appendicitis and peritonitis. The germ concerned in dysentery is, in the authors' opinion, undoubtedly *Bacillus coli communis*, and many are of the opinion that these germs, increased in virulence by passing through a susceptible individual and again into the sewage-polluted water, infect others, and thus produce some of the cases of pseudotyphoid enteritis, which do not give the Widal reaction with the laboratory standard typhoid culture. Several cases of enteritis resembling typhoid, but failing to give the Widal reaction with the typhoid bacillus, are described. The milk used by the patients contained a bacillus apparently belonging to the colon group, but differing from the ordinary *Bacillus coli communis* in its extreme motility, its failure to coagulate milk, and its tendency to produce a diffuse growth in Hiss' medium. The source of infection was found to be an old well, the water of which was used to wash the milk cans. In many cases of typhoid fever a double infection exists—the primary one with *Bacillus coli communis* and the secondary one with the typhoid bacillus.

Typhoid Bacilli in Urine.—An editorial in the "Journal of the American Medical Association" ¹ says that typhoid bacilli occur in 25 % of all typhoid urines and they should be sought for in every case, but especially in turbid urines or when the slightest pain or local irritation is noted when urine is voided. They sometimes do not appear until the end of the third week. Their early detection may save the patient from annoyance and perhaps from something more serious, such as renal or vesical calculi. From the standpoint of spreading the disease, it is important to detect the bacilli in the urine. Neufeld ² contends that the danger from infected urine is greater than from feces similarly contaminated, because (1) a given quantity of urine contains a larger number of typhoid germs than a similar quantity of feces; (2) an article of clothing, a sheet, etc., may be soiled with urine and the accident will more readily escape notice than a similar mishap with fecal matter; (3) water fouled with fecal matter will give evidence to sight or smell more quickly than if the contaminating substance is the nearly colorless and less malodorous urine. Urine is more apt to be more carelessly thrown out than are feces. The bacilli remain for a much longer time in the bladder than in the intestine. They have been found in urine voided 5 years after the attack of typhoid. Thus a patient, months or years after his attack of fever, may unwittingly infect a supply of drinking-water and start an epidemic of the disease.

¹ Mar. 9, 1901.

² Deut. med. Woch., Dec. 20, 1900.

The Spread of Typhoid Fever through the Medium of the Milk-supply.—Schlegtendal¹ gives an account of 24 epidemics of typhoid fever reported in the literature and attributed to infection through the milk-supply. Kober² has also investigated a large series of epidemics of typhoid fever, diphtheria, and scarlet fever.

A case of general infection with the typhoid bacillus, but without intestinal lesions, is reported by Weinhardt.³

A case of suppurative thyroiditis caused by the typhoid bacillus is reported by Bertarelli.⁴

Changes Affected by Antityphoid Inoculations in the Bactericidal Power of the Blood.—Wright⁵ states with regard to the sequence of events after an antityphoid inoculation: (1) That when the quantum of antityphoid vaccine employed produces well-marked constitutional symptoms a decrease in the bactericidal power of the blood and a corresponding increased susceptibility to typhoid infection may supervene in the period immediately subsequent to the inoculation; upon this negative phase of increased susceptibility to typhoid infection, however, there may be expected to succeed, probably within a period of 3 weeks or less, a phase of increased bactericidal power and a greater resistance to typhoid; (2) that when the quantum of antityphoid vaccine employed produces very severe constitutional symptoms, a negative phase of increased susceptibility will be produced, which—and the same would appear to hold true also in case of a negative phase supervening upon an actual attack of typhoid fever—may never be followed by a positive phase of increased resistance; (3) that when the quantum of antityphoid vaccine employed is reduced to the point at which marked constitutional disturbance is avoided, a positive phase of increased resistance may be expected to supervene without the intervention of any negative phase, and in many cases within 24 hours.

Frequency of Typhoid Bacilli in the Blood.—For many years subsequent to the discovery of the typhoid bacillus by Eberth, in 1880, the attempts to cultivate the organism from the blood proved almost invariably negative.⁶ Subsequently a few isolated cases of typhoid septicemia were reported. Wissokowitsch found that the typhoid bacillus, when injected into the general circulation of animals, soon disappeared from the blood and found lodgment in various organs, particularly the liver, spleen, and bone-marrow. These observations led to the general view that the typhoid bacillus entered the general circulation only rarely and very quickly disappeared. Subsequent bacteriologic investigations have shown that this view is incorrect, and that typhoid septicemia is comparatively common. The early negative results were due to the failure to recognize the germicidal properties of the blood. The cultures were made with undiluted blood, and the concentrated bactericidal substances contained in it prevented the growth of the

¹ Deut. Vierteljahrssch. f. öffentliche Gesundheitspflege, H. 2, 1900; Centralbl. f. Bakt., etc., XXIX, 96, 1901.

² Am. Jour. Med. Sci., CXXI, 552, 1901.

³ Zeit. f. Hyg. u. Infektionskrankh., XXXVI, 440, 1900.

⁴ Centralbl. f. Bakt., etc., XXIX, 557, 1901.

⁵ Lancet, Sept. 14, 1901.

⁶ Am. Jour. Med. Sci., CXXII, 334, 1901.

bacilli. Kühnau was the first to take this property of the blood into consideration in making blood cultures in typhoid fever. He diluted the blood with 50 cc. of bouillon and immediately plated. His report in 1897 gave 11 positive results in 41 patients. Cole,¹ by a slight modification of the technic, has obtained even better results. From 8 cc. to 10 cc. of blood is obtained from one of the veins of the elbow after thoroughly disinfecting the part. No incision of the skin is made. The blood is immediately diluted in bouillon contained in Erlenmeyer flasks, about 150 cc. of bouillon being used in each flask. From one to six such flasks were used for each culture, the dilution being from 1 : 75 to 1 : 150. The flasks were then well shaken and placed in an incubator for 24 hours, after which, if the bouillon became cloudy, agar plates were made. The organism was identified by its usual characteristics, including its property to agglutinate with typhoid blood-serum. With this technic a positive result could be obtained in 36 hours. Cultures were made in 15 cases of typhoid fever, and positive results were obtained in 11. The earliest day on which the organism was isolated was the sixth. In 5 cases the blood cultures were positive before the Grüber-Widal test was obtained. The latest positive result was on the twenty-seventh day. Schottmüller reports having obtained positive results in 40 out of 50 cases, and Unger in 7 out of 10 cases. The importance of taking blood cultures in typhoid fever, considering these results and the fact that the Grüber-Widal reaction is delayed in many cases, cannot be overestimated. [These investigations are important as showing the frequency of bacteremia in typhoid fever.]

Autoinoculation of Typhoid Fever.—Motchoutkowsky² produced in himself an attack of typhoid fever by inoculating into his forearm some blood from a typhoid fever patient, the positive result being attained after seven unsuccessful attempts. The invasion occurred after a lapse of 18 days. From this it is concluded that the blood contains the typhoid bacillus and that the disease may be conveyed from the sick to the well by direct inoculation. [In view of the results of many recent investigations, including the finding of typhoid bacilli in the roseola of typhoid fever, etc., it can no longer be doubted that a bacteremia is an almost constant feature of typhoid fever.]

Bacteriolysis and Typhoid Immunity.—Richardson,³ from a study of bacteriolysis and typhoid immunity, concludes that: (1) In typhoid fever nature produces a cure through bactericidal agents acting upon the specific bacilli. These agents are produced by the body cells, especially those of the lymphatic apparatus, and are found in varying amounts in the blood. (2) These protective agents are at least 2 in number, a specific immune element and a non-specific normal element or ferment. (3) It is the function of the immune element to bind the complement or ferment to the bacterial cell, which is then destroyed. (4) In the earlier and middle stages of the disease the immune body may apparently be present in large amount, and yet be of little value

¹ Johns Hopkins Hosp. Bull., 203, 1901.

² La Semaine Méd., May 2, 1900.

³ Jour. of Med. Research, new series, 1, 187, 1901.

because of the absence of the complement. (5) In the stage of convalescence or falling temperature the normal element returns apparently to the blood, and a corresponding destruction of bacilli takes place. Further, inasmuch as this marked destruction of bacilli must set free an excess of typhoid toxin contained in the bacterial cells, we have in this fact a possible explanation of the marked remissions of temperature seen clinically in the fourth week of the disease. (6) Inasmuch as the addition of normal serum to the inactive serum of the sick typhoid patient will, in most instances, make the serum more powerful,—in fact, make it very similar to the serum found in the fourth week,—we should be justified, theoretically, in treating such patients with normal serum. (7) It will probably be found, however, that in certain cases the blood of the patient will lack both immune and normal elements, both of which will have to be supplied. Just what elements will be necessary can be determined probably by submitting the patient's blood to tests similar to those described. (8) The blood of a normal individual may, under conditions described, have very marked destructive power upon typhoid bacilli. This power is due, undoubtedly, to substances very similar to those found in typhoid serum. Their relation to the subject of natural immunity, of course, is of the greatest importance and needs much further study. (9) The principles set forth may apply to infections other than typhoid.

DIPHTHERIA.

The Interpretation of Bacteriologic Findings in Diphtheria Diagnosis.—H. W. Hill¹ states that to release a convalescent diphtherial patient from quarantine in Boston two consecutive negative cultures from the nose and throat are necessary. By the term "positive report" the Board of Health does not take the position that a sick person is necessarily suffering from diphtheria simply because a positive culture has been obtained, although this is usually true. The board does insist, however, that such a person is a nucleus from which the bacilli may be spread, and remains such until the bacilli disappear. The patient may be harmless, despite the positive culture, if the bacilli in his nose or throat are not actively producing toxins. But since the methods for determining that the bacilli do not produce toxins are impossible of application in practice to large numbers of cases, the board feels justified in assuming that they are virulent on the strength of abundant evidence which shows that the error involved in this assumption is small. Hence it is that a positive report on a case for diagnosis is considered sufficient evidence for the isolation of the sick person as infective. Regarding a negative report, the bacilli, although absent from cultures, may still be present in nose and throat, particularly in laryngeal cases. Five to 10% of positive cultures fail to yield a positive result on the first examination. At times "no growth" is reported; this is usually due to faulty technic, as dry tubes or growth of bacteria which liquefy

¹ Boston M. and S. Jour., Mar. 7, 1901.

the medium. A second culture is asked for if the first culture is negative, and physician states: (a) a membrane is present on pharynx and tonsils; (b) if he makes clinical diagnosis of diphtheria; (c) if "nose bacillus" is found. This latter probably belongs to the diphtheria group and is often virulent. The principle of release from isolation by culture in diphtheria is analogous to that of waiting for the desquamation to cease before release in scarlet fever. In one the infective agent is supposed to be on the scales and is evident to the eye; in the other, however, it is only perceptible by cultural tests, and much difficulty is found at times in making clear the necessity for their disappearance before release is granted. Release on one negative culture allows 30 % of the total "positive" persons released to go out of isolation while the bacilli are still present; if two consecutive negative cultures for release be demanded, only 1 % to 3 % of those released will be still infective. [In Philadelphia the custom prevails of removing the quarantine upon the first negative result of culture. The experience of Boston shows that this practice is not altogether wise.]

Morphologic Varieties of the Diphtheria Bacillus.—Gorham,¹ from a study of 2375 cultures undertaken with especial reference to an examination of the morphologic varieties of the diphtheria bacillus, concurs with Westbrook's² opinion that granular types of the diphtheria bacillus usually predominate at the onset of the disease; that the granular types generally give place wholly or in part to barred and solid types shortly before the disappearance of diphtheria-like organisms; and that solid types sometimes may be replaced by granular types when convalescence is established, just before the throat is cleared of diphtheria-like bacilli. In addition, Gorham states that diphtheria-like bacilli are more frequent in the nose than in the throat; that there are diphtheria-like bacilli in the noses and throats of a large percentage of apparently healthy persons; that by a careful study and classification of the various forms of *Bacillus diphtherie* many morphologic varieties may be recognized; that the change from the granular or barred types to the solid staining types seems to take place under the influence of the body fluids of an individual immune or becoming so; that the virulence of *Bacillus diphtherie* seems to be correlated with its microscopic form; that the so-called xerosis, pseudodiphtheria, or Hoffmann's bacilli are morphologic varieties of *Bacillus diphtherie*, sometimes capable of producing clinical diphtheria, but usually nonpathogenic for guinea-pigs; that we do not know whether the solid staining types regain their virulence when once they have lost it, though this seems probable; and that Neisser's stain is of no value in differentiating the barred or solid types of *Bacillus diphtherie*.

The Differential Diagnosis of the Different Varieties of the Pseudodiphtheria Bacillus and Their Relation to the Neisser Double Stain.—Gromakowsky³ believes there are three forms of the

¹ Jour. of Med. Research, new series, 1, 201, 1901.

² Tr. Assoc. of Am. Phys., 1900; Tr. Am. Public Health Assoc., 1900.

³ Centralbl. f. Bakt., etc., XXVIII, 136, 1900.

pseudodiphtheria bacillus that differ in their cultural characteristics, especially in their growth in bouillon. The first is a relatively thick bacillus of varying length and does not cloud bouillon. It resembles the Klebs-Löffler bacillus in that it stains by the Neisser method and produces acid in bouillon cultures. It is to be distinguished by its greater thickness and cultural peculiarities. The second variety is a bacillus of moderate thickness and length that at the end of 24 hours, at a temperature of 36° C., produces marked clouding of bouillon and a considerable deposit. It resembles the Klebs-Löffler bacillus closely, and is to be distinguished from it by the nonoccurrence of acid formation in bouillon, and by the failure to stain by Neisser's method. The third variety is a short, thin bacillus that clouds bouillon only slightly and forms but little deposit. Morphologically it resembles somewhat the Klebs-Löffler bacillus. Neisser's stain, the author holds, is not a trustworthy means of differentiating between the Klebs-Löffler and the pseudodiphtheria bacillus, as some of the latter stain by this method. The distinction between the two bacilli is to be made only by means of animal inoculations.

Stain for Diphtheria Bacilli.—To replace Neisser's stain, Piorowski¹ recommends the following procedures: (1) Stain the cover-slip preparation with Löffler's methylene-blue, warmed slightly for $\frac{1}{2}$ minute; (2) decolorize with 3% acid alcohol (5 seconds); (3) wash in water; (4) counterstain with a 1% watery solution of eosin (10 seconds); (5) place on a slide with the stained side down and remove the excess of water with bibulous paper. Examine with an oil immersion lens. The picture is much sharper if the preparation is examined in water than if mounted in balsam. The stain is most successful in cultures from 10 to 24 hours old, grown at a temperature of 35° C. Although Löffler's blood-serum is the best medium for the cultivation of the bacilli, the polar granules are to be observed in bacilli grown on other media. After a sojourn in the incubator the poles of the diphtheria bacilli sometimes assume very large club-shaped appearances. In this swelling the polar granules do not participate; on the contrary, they break up into smaller granules and disappear, in part at the end of 2 days, in part later.

Double Stain for the Diphtheria Bacillus.—Pitfield² suggests the use of a new method for staining the diphtheria bacillus. Three solutions are required: (a) Silver nitrate 5 grams, distilled water 5 cc., and saturated alcoholic solution of fuchsin 3 cc.; (b) pyrogallie acid 1 gram, 10% sodium hydrate in water 5 cc., distilled water 10 cc.; (c) carbol-fuchsin solution 10 drops, distilled water 10 cc. After making a cover-slip preparation it should be fixed by heat. "Then pour on solution a, boil for 1 minute, wait a minute, and wash; then pour on solution b, doing the same; then pour on solution c for a minute or two, wash, dry, and examine." The organisms appear delicately pink, of slightly uneven shades, corresponding to the heaping of the protoplasm.

¹ Centralbl. f. Bakt., etc., XXIX, 63, 1901.

² Univ. of Penna. Med. Bull., XIV, 274, 1901.

At one or both ends, and often in the middle, brilliantly shining black points appear, which stand out sharply and clearly. The cell membrane appears a gray-brown of very light shade.

PNEUMOCOCCUS.

Pneumococcus Infection.—Foulerton¹ discusses the virulence of the pneumococcus isolated from healthy individuals and that from different diseased conditions, as well as the pathogenic action of the pneumococcus in man, with special reference to (1) the general results of blood infection and those of the toxemia produced by the absorption and circulation of toxins formed at the local foci of infection in the tissues, or produced by bacteria that have infected the blood itself; (2) the direct action of the parasite on the various tissues in which it becomes located in the course of an infection; and (3) the secondary results of the infection, due not to the direct action of the infecting organisms, but arising out of the new morbid conditions brought about by the infection. The following conditions are dealt with in detail: Toxemia in pneumococcus infection, the local action of the pneumococcus on the tissues infected; pneumococcus abscess and cellulitis, fibrinous lobar pneumonia, pneumococcus empyema, pneumococcus meningitis, pneumococcus peritonitis, etc., immunity and serum-diagnosis. Bryant,² reporting a case of pneumococcus peritonitis, speaks of primary and secondary pneumococcal peritonitis, according as the peritoneum is the first structure involved or not, and of local or encysted and general or diffuse peritonitis, according to the distribution of the lesions. The anatomic changes and the possible sources of infection are dealt with in detail. It is believed that many of the cases are manifestations of general pneumococcus blood infection, whereas others start as a peritonitis, and the patients die from a subsequent pneumococcus septicemia. [The pneumococcus, as already indicated in the YEAR-BOOK for 1901, is generally present in the blood in pneumonia, but in order to discover it it is necessary to use large quantities of blood for purposes of cultivation and to dilute the blood well in liquid culture media.]

Agglutinating Reaction of the Blood-serum in Experimental and Human Infection with the Pneumococcus.—In the study of the agglutination of the pneumococcus, the ordinary Widal method cannot be employed. The blood is obtained from animals by bleeding from the carotid; from human beings, from a vein at the elbow with a needle. The blood is allowed to clot, and the serum to the amount of from 1 cc. to 2 cc. is distributed into sterile test-tubes which are then inoculated with pneumococci and placed in an oven at 37° C. for from 15 to 16 hours. At the end of that time the culture is examined with the naked eye and with the aid of the microscope. If the serum has come from a normal rabbit, the medium is turbid without any sediment, and the microscopic examination shows the presence of encapsulated

¹ Brit. Med. Jour., II, 760, 1901.

² Brit. Med. Jour., II, 767, 1901.

pneumococci occurring singly. If normal serum has been employed, the serum is scarcely clouded, and under the microscope there are encapsulated diplococci, occurring in doubles or in chains of three or four members. In the case of pneumococcic infection the culture presents itself under two aspects; either the serum remains clear and at the bottom there is a precipitate (macroscopic agglutination), or the serum is uniformly clouded and the microscope alone shows the agglutination (microscopic agglutination). In the latter case the microscopic examination reveals chains or groups of chains. Benzançon and Griffon¹ have examined 186 persons suffering with various lesions due to pneumococcus. Of these, 39 had pneumonia; in all of these the agglutinating reaction was present. Its time of appearance is variable, and usually it is best marked on the day before defervescence; sometimes, however, its maximum corresponds with the beginning of the critical phenomena, and sometimes with the first day of convalescence. In the bronchopneumonias due to the pneumococcus, in pneumococcic lesions without pneumonia, purulent pleurisy, endocarditis, etc., the reaction was always positive. The agglutinating reaction is not so sharp and specific as that of typhoid fever, for it seems that the blood-serum of patients agglutinates especially, and sometimes solely, that pneumococcus which is derived from their own mouth. The authors endeavored to determine whether the human lesions produced by different specimens of pneumococci separated by the agglutination test differed in any way; if, for instance, the pneumococcus of frank pneumonia could be separated by agglutination from that of other pneumonias; but the attempts were unsuccessful. It would seem that the agglutination reaction as regards certain organisms is too delicate a test to serve as a basis of classification; for it separates not species, nor even races, but merely particular specimens.

TETANUS.

The Etiology of Tetanus.—Thalmann,² as the result of an elaborate series of experiments, believes that in guinea-pigs the digestive and urinary tracts, whether healthy or unhealthy, do not serve as channels of infection for tetanus, while the mouth as a point of entrance differs in no way from the skin. The nose offers very favorable conditions for infection either directly or by inhalation; inhalation is especially likely to give rise to infection when catarrh exists. Inoculation of spores into superficial wounds is followed by chronic and eventually fatal conditions, without tetanic manifestations. In so-called idiopathic tetanus in man the mouth and the nose should be suspected as points of infection; and so-called rheumatic tetanus probably also arises in connection with a diseased condition of the respiratory tract apart from infection by the tonsils. [In regard to treatment in the last-named condition, it is suggested that, in addition to the administering of serum, the

¹ Ann. de l'Institut Pasteur, July, 1900, p. 449.

² Zeit. f. Hyg. u. Infektionskrankh., XXXIII, 1900.

continuous inhalation of oxygen and the use of expectorants may be attended by good results.]

The Influence of Tetanus Toxin upon the Central Nervous System.—Joukowski ¹ has studied this question upon guinea-pigs and has arrived at the conclusion that there are modifications in the nervous system which affect the chromatophilic substance and the nucleus. They are characterized by their variability and inconstancy; for this reason they cannot be considered specific. The changes most often encountered are an accumulation of mononuclear wandering cells about the nerve-cells and their penetration into the latter. This is especially noticeable in the anterior group of cells in the anterior horn and around the central canal, and is most marked in chronic intoxications. The phenomenon should be considered as an expression of phagocytosis, which is developed under the influence of the toxin upon the nerve-cells, and which serves as a sign of the death or, at least, of the enfeeblement of the nervous elements under the virus.

YELLOW FEVER.

The Etiology of Yellow Fever.—Reed, Carroll, and Agramonte,² as a result of a long series of studies and experiments, conclude: (1) The mosquito (*Culex fasciatus*) serves as the intermediate host for the parasites of yellow fever. (2) Yellow fever is transmitted to the non-immune individual by means of the bite of the mosquito that has previously fed on the blood of those sick with this disease. (3) An interval of about 12 days or more after contamination appears to be necessary before the mosquito is capable of conveying the infection. (4) The bite of the mosquito at an earlier period after contamination does not appear to confer any immunity against a subsequent attack. (5) Yellow fever can also be produced experimentally by the subcutaneous injection of blood taken from the general circulation during the first and second days of the disease. (6) An attack of yellow fever, produced by the bite of the mosquito, confers immunity against the subsequent infection of the blood of the individual suffering from the non-experimental form of the disease. (7) The period of incubation in 13 cases of experimental yellow fever varied from 41 hours to 5 days and 17 hours. (8) Yellow fever is not conveyed by fomites, and hence disinfection of articles of clothing, bedding, or merchandise, supposedly contaminated by contact with those sick from this disease, is unnecessary. (9) A house may be said to be infected with yellow fever only when there are present within its walls contaminated mosquitos capable of conveying the parasite of the disease.

The Germ of Yellow Fever.—Charles Smart ³ quotes Sternberg, Carroll, Reed, Agramonte, and Lutz as having asserted and proved that Sanarelli's *Bacillus icteroides* is not the cause of yellow fever. Agramonte isolated it from three cadavers in which death was not due

¹ Ann. de l'Institut Pasteur, July, 1900.

² Jour. Am. Med. Assoc., XXXVII, 431, 1901. ³ Phila. Med. Jour., Oct. 20, 1900.

to yellow fever. Reed and Carroll believe it to belong to the hog cholera group, and did not find it in 7 cases of yellow fever which they studied. Lutz says Sanarelli's serum has neither bactericidal nor antitoxic qualities for the bacillus used in producing it, and the bacillus cannot be found by known methods of research in more than half the cases of yellow fever. He believes that those observers who report to have found it in all cases, and to be able to make the diagnosis by the agglutinating action of the blood, are the victims of gross errors of observation. Sternberg, after much experimental research, does not believe that either his own *Bacillus X* or Sanarelli's bacillus is the specific agent of yellow fever. [The transmission of yellow fever through the agency of the mosquito seems to have been proved by Carroll and by the lamented Lazear. Whether the mosquito is the only medium is, however, not yet demonstrated. The insect, after biting a yellow fever patient, becomes capable of conveying the disease in about 12 days, showing that the parasite, whatever its nature, passes through some change or metamorphosis in the mosquito's body.]

INFLUENZA.

The Role of Influenza as a Mixed Infection in the Exanthematic Diseases, and the Occurrence of Influenza Bacilli in the Blood.—Jehle¹ details the results of his investigations of a number of cases of scarlet fever, measles, varicella, pertussis, diphtheria, and a number of different diseases in adults, with reference to mixed infection with the influenza bacillus. Influenza is a common secondary infection in childhood, and may occur early in the course of the primary disease. The influenza bacillus usually is in the lower respiratory tract, but it may remain localized on the tonsils. With the occurrence of influenza-mixed infection an increased morbidity and mortality develops. In the acute exanthemas an invasion of the blood-stream with the influenza bacillus probably entering from the tonsils regularly occurs. This bacteremia may develop very rapidly, and in scarlet fever may be observed even before the eruption. In the nonexanthematic diseases and in adults the influenza bacillus rarely is found in the blood. If, however, influenza bacteremia does occur, severe organic lesions, such as carditis, pleuritis, endopericarditis, brain abscess, etc., ensue. The exanthemas in some manner predispose the organism to infection with the influenza bacillus, and facilitate the entrance of influenza bacilli into the blood. Experiments with regard to the reaction of homologous serum, agglutination phenomena, and animal investigations led to indefinite results.

Influenza Endocarditis.—Schlagenhauser² reports a case of endocarditis of the aortic valves and patulous foramen ovale in a boy aged 13 years. Cover-slip preparations from the vegetations revealed a small, thin bacillus, but cultures were not conclusive. The organism, however, is thought to have been the influenza bacillus, and this opinion

¹ Zeit. f. Heilk., XXII, 190, 1901.

² Zeit. f. Heilk., XXII, 19, 1901.

is strengthened by the detection of a similar bacillus in sections of the vegetations and in sections of the lung (in the purulent exudate in the bronchioles). The case is thought to be the fourth on record in which there is anatomic evidence that the endocarditic process was in all probability due to the influenza bacillus. The repeated occurrence of pulmonary infarction in the case leads Schlagenhauser to suggest that in cases of evident valvular disease of the left side of the heart, especially aortic disease, the development of so-called crossed embolism might lead the clinician to suspect the possibility of patulous arterial duct (or patulous foramen ovale or ventricular defect).

GONOCOCCUS.

A case of gonorrheal ulcerative endocarditis with cultivation of the gonococcus is reported by Lartigan,¹ who concludes that gonorrheal urethritis may be the starting-point of a fatal septicemia induced by pure infection with the gonococcus; that endocarditis and arthritis are occasionally complications of such an infectious disease; and that the endocardial processes may be incited by the gonococcus without the association of other organisms.

Morbid Conditions Caused by *Bacillus Aerogenes Capsulatus*.
—Welch² discusses the numerous **gas-producing microorganisms** that have been described, all of which, he claims, are identical with *Bacillus aerogenes capsulatus* discovered by him in 1891. This is a coarse, nonmotile, anaerobic bacillus, staining by Gram, growing on all ordinary culture media under anaerobic conditions, best at body temperature, forming spores inconstantly according to the race and the culture medium, capable of forming gas by fermentation not only of sugars, but also of proteids. It is widely distributed in nature, its natural habitat being the intestinal canal and the soil, but it has been found in dust, infected bullet-wounds, skin, etc. Its intestinal habitat explains its presence in ordinary cadaveric decomposition, but when bacilli and gas are found throughout the body a few hours after death, the former probably entered the circulation during life, in most cases shortly before death. There is no evidence which clearly proves the formation of gas during life, but Welch believes that in certain cases of emphysema, especially of the liver, where it is such a conspicuous postmortem phenomenon, the gas production began during the life of the patient; in the great majority, however, the evidence supports the view that the gas bubbles are purely a postmortem phenomenon. The gas bacillus, like the tetanus bacillus, has been found in wounds without characteristic effects. This is probably due to attenuation of the bacilli, resistance of the patient, and other accessory circumstances. In such cases free incisions, thorough cleansing and disinfection have probably warded off grave infections. As the cause of emphysematous gangrene, however, the micro-

¹ Am. Jour. Med. Sci., CXXI, 52, 1901.

² Boston M. and S. Jour., 1900, CXLIII, 73.

organism is of especial interest to surgeons. Other bacilli, as the bacillus of malignant edema, the colon and proteus bacilli, have at different times been claimed as the cause of this condition. The first he has never been able to isolate from such cases. Regarding the colon bacillus, he is of the opinion that an aerobic bacillus which closely resembles both the vulgaris and the aerogenes capsulatus and is capable of producing the affection has been mistaken for it. He reports 46 cases of emphysematous gangrene in which the gas bacillus was clearly demonstrated; 35 of these were in men, and nearly all were robust workmen in the prime of life. In 41 the disease followed traumatism or surgical operations. The extremities were affected oftenest, but also the tissues of the abdominal wall, etc. In nearly all the cases the bacillus came from without; but in 4 positively, in others probably, it came from the intestinal canal and circulation. In 30 of the cases the infection was mixed, but apart from purulent inflammation the clinical features were not affected by this. The clinical and anatomic lesions comprise necrosis of all the tissues, the presence of gas in the intestines, infiltration with blood, evidences of the mechanical action of the gas, and exudation of a variable amount of bloody serum, almost complete absence of leukocytes and cellular reaction, disappearance of nuclei by karyolysis; emboli of fat and bone-marrow are frequently found in pulmonary capillaries. Of the 46 cases, 19 (41%) recovered. When the disease is accessible and not otherwise complicated, when promptly recognized and treated, the prognosis is not very unfavorable. When death occurs it is usually due to toxemia. In 5 cases of emphysema of the fetus, 3 cases of puerperal endometritis, 10 cases of physometra, 11 cases of emphysema of uterine wall, 12 cases of puerperal gas sepsis, the gas bacillus has been isolated as the cause. Invasion in the case of the fetus was through its mouth inspiring or swallowing amniotic fluid. In physometra infection is also from the fetus or amniotic fluid after rupture of membrane; it has also arisen from sloughing myomas and carcinomas. Prognosis regarding the mother in the first 3 is good, but almost invariably fatal in the last 2. Many cases of gas sepsis have been preceded by criminal abortion, forced delivery, the manipulations of an unskilled midwife, or other causes. The suddenness of death is a notable feature of many of the cases. Most of the cases in which death is reported to be due to entrance of air into uterine veins belong here. Among other structures and diseases, when the gas bacillus was isolated, are gas cysts in the renal pelvis and urinary bladder, necrosis of the stomach and intestines, pneumoperitonitis with and without perforation, circumscribed intraperitoneal abscess, infection of gall-bladder and biliary passages, submucous and subserous cysts in different parts of the body, pulmonary gangrene, pneumothorax, pneumopericardium, meningitis, and cavities in the brain.

Acute Emphysematous Gangrene.—D. Singer and E. N. Corner¹ point out that two groups of bacteria, the aerobic and anaerobic, may produce this disease. Sanfelice's *Bacillus œdematis aërobicus* is

¹ Brit. Med. Jour., Dec. 8, 1900.

the aerobic organism. It differs from the colon bacillus in only a few minor points. It is always associated with some of the pyogenic organisms; when injected experimentally in pure culture, it produces an edematous swelling without gangrene or emphysema. The second group includes the bacillus described as the *aerogenes capsulatus* by Welch and under other names by Fränkel and Veillon, and Pasteur's bacillus of malignant edema; the first of these is the most common cause. In nearly all cases, however, as in their own case, aerobic, anaerobic, and pyogenic organisms were isolated. The septic organisms precede the gas-producing bacilli in their work.

A Case of General Gaseous Emphysema with Gas-cysts in the Brain Formed After Death and Due to *Bacillus Mucosus Capsulatus*, with a Consideration of the Gas-producing Properties of Certain Members of this Group in the Cadaver of Animals.—

Howard¹ reports the case of a woman 40 years old, who was comatose on admission, with a regular rhythmic pulse, 108 per minute, Cheyne-Stokes respiration, cold cyanosed extremities, moist skin, incontinence of urine; chest and abdomen were negative; history of taking large quantities of morphin. No swelling or subcutaneous emphysema of chest or other part of body was noticed during life. Twenty-four hours after death there was **general gaseous emphysema** of the subcutaneous tissues, heart, blood-vessels, liver, spleen, and kidneys, and gas-cysts of the brain, all due to *Bacillus mucosus capsulatus* (aerogenes group). There was septicemia with special localization of the micro-organisms in the brain. [The bacillus isolated in this case, as well as other members of the group, possesses the power of causing general gaseous emphysema in rabbits after death, when injected antemortem with or without sugar. The intravenous injection of sugar, however, leads to the more rapid formation of gas.]

The Etiology of Rheumatic Fever.—Poynton and Payne² have isolated a diplococcus from 11 cases of typical rheumatic fever and have carried on experiments with rabbits, during which they produced characteristic lesions in them. These are acute valvulitis, endocarditis, pericarditis, arthritis with effusion, with pyrexia and wasting; at no time was suppuration noted. In one case involuntary clonic movements as in chorea were noted. This rabbit was very nervous and had valvulitis. Besides the diplococcus, a large, solitary coccus was found in some cases; it was also seen in human tissues. They consider this alteration to be due to a loss in virulence, alteration in chemistry of tissues, or both. It was always found when the patient was improving. Wherever the opposite was taking place, as in malignant endocarditis, the diplococci became smaller and more numerous.

W. R. Nicholson, Jr.,³ reports a case of *melæna neonatorum*, due apparently to an infection by *Bacillus pyocyaneus*.—An apparently healthy baby developed stomatitis on the sixteenth day, which was followed by hemorrhage from the entire buccal mucous

¹ Jour. of Exper. Med., v, Oct. 25, 1900.

² Lancet, II, Oct. 20, 1900.

³ Am. Jour. Med. Sci., 1900, CXX, No. 4.

membrane, melena, fever, and death 3 days later. The autopsy showed hemorrhagic effusion around the umbilicus and in the peritoneal cavity, sclerosis of the pancreas, acute enteritis, commencing cirrhosis of the liver, and a general parenchymatous degeneration. *Staphylococcus pyogenes aureus* and *Bacillus lactis aerogenes* were isolated from nearly all the structures, *Bacillus pyocyaneus* from the bile and the liver. Nicholson considers this a case of infection with *Bacillus pyocyaneus* on account of the negative history of the first 16 days of life, followed by an acute infection; the complete absence of any pathologic lesion sufficient to cause death; the presence of *Bacillus pyocyaneus* in the bile and liver in a condition of virulence; and the association of hemorrhage as a symptom. Against this supposition are the localized area in which *Bacillus pyocyaneus* was found, as compared with the distribution of the other two organisms, and its absence from the alimentary tract. The hemorrhage in particular is strong presumptive evidence that *Bacillus pyocyaneus* was the chief infecting agent. The origin of infection could not be found, but is supposed to have been the mother's nipple.

Infection with *Bacillus Pyocyaneus*.—Perkins¹ reviews the literature and reports 9 cases.

***Streptococcus Mucosus* (Nov. Spec.?) Pathogenic for Man and Animals.**—Howard and Perkins² describe a streptococcus obtained from a tuboovarian abscess, peritonitis, spleen, and heart's blood—a streptococcus similar in some respects to the organism already described by Bonome³ (streptococcus of epidemic cerebrospinal meningitis) and Binaghi⁴ (*Streptococcus capsulatus*, obtained from a case of spontaneous peribronchitis and multiple pulmonary abscesses in a guinea-pig). For the group of organisms composed of the streptococcus of Bonome, Binaghi, and their own, Howard and Perkins propose the name *Streptococcus mucosus*. The Howard and Perkins organism in the lesions occurred as biscuit-shaped cocci, in pairs and in chains of from 4 to 20 or more elements surrounded by a distinct capsule that stained readily. In cultures the organisms occurred in chains of from 4 to 100 elements, were biscuit-shaped, and were surrounded by a distinct halo, that did not stain except when grown in milk. On neutral agar (plain, glycerin, and glucose) the growth after 24 hours at body-temperature was thin, very moist, and transparent, and grayish-white colonies reached 3 millimeters in diameter. The organism was facultative anaerobic, produced a small amount of acid, but no indol, and it stained by Gram's method. It was pathogenic for white mice, guinea-pigs, and rabbits, producing local fibrinous, mucoid, and hemorrhagic edema and fibrinous and mucoid exudations on the serous membranes, but no phagocytosis. Large numbers of capsulated streptococci were found in the lesions. The virulence was lost rapidly in artificial cultures. When inoculated from animal to animal, the virulence was markedly increased.

¹ Jour. of Med. Research, new series, 1, 281, 1901.

² Jour. of Med. Research, new series, 1, 163, 1901.

³ Ziegler's Beitr., VIII, 377, 1890. ⁴ Centralbl. f. Bakt., etc., XXII, 273, 1897.

Hemorrhagic Infection in Man.—Babes ¹ divides hemorrhagic infections into three classes: The first class comprises hemorrhagic infections caused by specific hemorrhagic bacteria, that occur usually as complications of other diseases and are characterized by the development of multiple hemorrhages with predominance of septic or hemorrhagic manifestations; the second class comprises infections that result from the combined action of certain pathogenic bacteria and putrefactive bacteria—cases in which the soluble products of the bacteria, not the bacteria themselves, act upon the tissues; and the third class comprises infections caused by the ordinary bacteria of septicemia and suppuration—cases in which there is a very favorable soil or highly virulent bacteria, generally streptococci. Having presented illustrative cases of each group, Babes considers the relation of the plague bacillus to hemorrhagic septicemia and concludes that this bacillus belongs to the group of hemorrhagic bacilli, opposing the view of Charrin, who doubts the occurrence in man of hemorrhagic infections due to specific bacilli. Some observations are detailed that seem to throw some light upon the occurrence of the hemorrhage in these cases. Contrary to the opinion of Unna and Sack, Babes believes that certain alterations, especially hyaline degeneration, of the blood-vessels are answerable for the hemorrhages. This opinion is supported by details from several cases, more especially from cases of hemorrhagic puerperal septicemia. In one case Babes was able to isolate from all the organs a diplobacillus which he believes holds some relation to the hyaline and fibrinous metamorphosis of the blood-vessel walls present in the case.

Bacteriologic Investigations of Fetid and Gangrenous Suppuration.—Rist ² draws attention to the discrepancy often noted in the microscopic examination of pus and the results of culture inoculations. From this he was led to investigate the possibility of anaerobic bacteria being the cause of fetid suppurative inflammations. From the results of his researches he believes that whenever there is a fetid suppuration or an active gangrenous process anaerobic germs are at the bottom of it. Numerous and varied though these be, they must be considered the specific cause of this kind of process. It is stated that if we bear in mind how frequently fetidness is a characteristic of suppuration, especially in abdominal and urinary inflammations as well as in abscesses connected with the throat or ears, we may form an idea of the considerable part played by anaerobic bacteria in human pathology. It is believed that too much importance has been given *Bacterium coli commune*, and that whenever this bacterium is found, anaerobic bacteria also will be found. [We are inclined to attach considerable importance to this view, and to suggest the wisdom of the frequent examination of the products of fetid inflammation for anaerobic bacteria.]

Rist ³ gives a critical summary of some recent literature on the bacteriology of **gangrenous and fetid suppuration.**

Bacterial Origin of Hay Fever.—Axelos and Rhodes ⁴ describe a

¹ *Centralbl. f. Bakt., etc.*, XXVIII, 326, 1900.

² *Brit. Med. Jour.*, II, 1052, 1901.

³ *Centralbl. f. Bakt., etc.*, XXX, 387, 1901.

⁴ *La Semaine Méd.*, Feb. 6, 1901.

micrococcus that they have isolated in cases of hay fever and to which they attribute etiologic significance. They assume that the bacterium produces a toxin which, being absorbed, irritates the pneumogastric nerve and thus brings about spasmodic contracture of the bronchi.

Weil's Disease.—In a case of Weil's disease, Conradi and Vogt¹ were able to isolate an organism, *Bacillus proteus fluorescens*. The studies are scarcely thorough enough to warrant any conclusions whatever. The organism was pathogenic, but did not seem to reproduce the picture of Weil's disease. There was no jaundice in the animals.

Bacteria in the Cerebrospinal Fluid in Herpes Zoster.—Archard,² investigating the fluid obtained by lumbar puncture from cases of herpes zoster, isolated a bacillus resembling *Bacterium coli commune*, and concludes that the condition is the result of a specific infection.

Bacteria in Aseptic Wounds.—Schenck and Leichtenstern³ give a good review of the work of other investigators and the result of their own researches into the bacterial contents of aseptic wounds. In agreement with the findings of others, they found the wounds but rarely sterile—in but 11 of 43 cases. (Excepting 4 cases in which but a single examination was made, in but 7 cases, 16%.) *Staphylococcus pyogenes albus* was commonly the infecting agent; in but 1 case each *Staphylococcus pyogenes aureus* and *Streptococcus pyogenes* were found. In 39 of the cases healing occurred without inflammatory manifestations—even in the case from which *Staphylococcus pyogenes aureus* was isolated. The greatest number of bacteria was found on the second day of the wound healing. After this day they usually decreased in number, so that by the fifth day the wound was free from bacteria. When this was not the case, inflammatory manifestations supervened. They believe that the "aseptic fever" is due to the absorption of organic materials and of the products of bacterial metabolism from the wound, but they are unable to say to which in a given case more importance should be ascribed. They believe also that the bacteria are derived in part from the skin of the patient and in part from the hands of the operators.

Leptothrix Infections.—Pearce⁴ gives a review of the literature of leptothrix infections in men, and reports a case of leptothrichal necrosis of the cartilage of the larynx, and a case of leptothrichal cholelithiasis and cholangitis.

Refractory Subcutaneous Abscesses Caused by Sporothrix Schenckii: a New Pathogenic Fungus.—Hektoen and Perkins⁵ have isolated in pure culture from subcutaneous abscesses which would not yield to ordinary treatment and were associated with induration, abscesses, and ulceration along the lymph-channels, a pathogenic fungus, which they call *Sporothrix Schenckii*. It thrives well and characteristically upon plain, glycerin, wart, and glucose agar, blood-serum, gel-

¹ Zeit. f. Hyg. u. Infektionskrankh., XXXVII, 2, 1901, S. 283.

² La Semaine Méd., Mar. 20, 1901.

³ Zeit. f. Heilk., XXII, 115, 1901.

⁴ Univ. of Penna. Med. Bull., XIV, 217, 1901.

⁵ Jour. of Exper. Med., v, Oct. 1, 1900.

atin, bouillon, and vegetable infusions. It grows slowly upon potato, milk, hydrant water, and Gasperini starch. It requires air for its growth, does not ferment agar, nor liquefy blood-serum, but does liquefy gelatin slowly. It grows best at 37° C., and is killed by being exposed to 60° for 4½ minutes. The masses stain unevenly, are composed of rather thick threads with infrequent true side branches, among which lie ovate bodies 3 to 5 μ long, and which in unstained preparations are seen to be connected with the mycelium by means of short pedicles. They stain by Gram's method. Different species of animals were experimented with, but especially were rats and mice found susceptible, guinea-pigs, etc., being less so. The fungus produced slow, circumscribed, nodular inflammations, with necrosis and pus in the center, and granulation and fibrous tissue at the periphery. It exists within these lesions in spore form, multiplying as such. Threads do not seem to develop in the tissues of susceptible animals.

Experimental Aspergillosis.—From an experimental study of aspergillosis and a review of the literature on the subject Rothwell ¹ concludes that both *Aspergillus niger* and *Aspergillus fumigatus* are capable, experimentally, of producing lesions that resemble one another histologically. Both organisms are capable of germinating in the living tissues, but *Aspergillus fumigatus* much more so than *Aspergillus niger*. Whereas the injection of *Aspergillus fumigatus* led to the death of the experimental animal, the injection of *Aspergillus niger* never did. Both organisms are very resistant, as is shown by the presence of *A. fumigatus* at all times on leaves, barks of trees, etc., and its resistance in the tissues; and by the resistance of *A. niger* in the tissues and the successful cultivation of spores 7 years old.

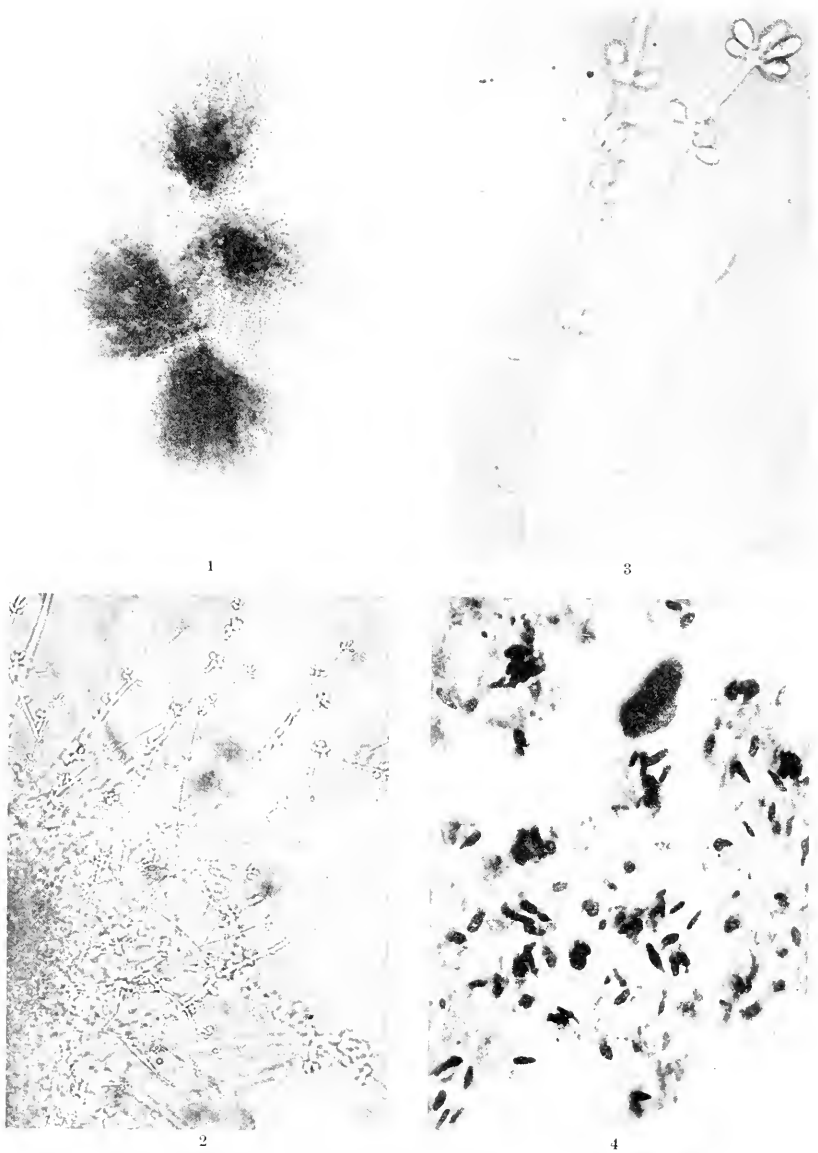
VACCINIA.

The Cause of Vaccinia and Variola.—Funck ² is convinced that vaccinia is not a bacterial disease, but a disease due to protozoa infection; that the inoculation of *Sporidium vaccinale* produces vaccinia in the cow; that the inoculation of the same organism protects against vaccinia; that variola is produced by the same organism; that this organism can be found in all variolous pustules; and that the protozoon found in the virus of vaccinia and that found in the virus of variola are identical. Examination by the hanging drop method of vaccine-lymph mixed with bouillon is said to reveal close to the under surface of the cover-slip (not on the surface of the hanging drop) characteristic elements of the lymph, which may be stained readily with Sudan III. These consist of cysts filled with spores and of varying form—round or egg-shaped. The round cysts in general are 25 μ in diameter and are probably leucocytes filled with spores. At times they are sharply delimited—probably due to the presence of a membrane; at times this membrane is absent and the cysts assume a characteristic raspberry ap-

¹ Jour. of Path. and Bact., VII, 34, 1901.

² Centralbl. f. Bakt., etc., XXIX, 921, 1901.

PLATE I.



Refractory subcutaneous abscesses caused by *Sporothrix Schenkii* (Hektoen and Perkins, in Jour. Exper. Med.).

Fig. 1.—Colonies on glycerin-agar plate, 48 hours old.

Fig. 2.—Margin of living hanging drop culture (gelatin). $\times 120$.

Fig. 3.—Same as Fig. 2, $\times 800$. Unstained living culture.

Fig. 4.—Photograph of section of abdominal nodule in white rat. 800. Gram's stain. Cells and spores, the latter oblong and deeply colored.

pearance. The egg-shaped cysts are 30 to 35 μ in length, and from 20 to 25 μ in width, without a nucleus, and frequently with a double contoured membrane. In addition to these cells, there are often club-shaped, flash-shaped, or pear-shaped sudanophile cells, that should not be mistaken for the cysts; they are merely cells from the sweat-glands. The cysts, while present in considerable numbers, do not form the principal constituents of the lymph, which are made up of free spores. These are round, 1 to 3 μ in diameter, refractile and ameboid. At a temperature of 37°, in the incubator, they multiply. In addition to the cysts and spores, the lymph contains other forms that are much larger than the cysts. These are oval in shape, filled with spores, do not stain with either Sudan III or osmic acid, and present toward their periphery a flattened nucleus. They are evidently epithelial cells filled with the parasite. They are especially evident in preparations stained with Sudan III and methylene-blue. The different forms observed are believed to represent different stages in the development of the organism. [The organisms described doubtless are those noted by a number of previous investigators—Pfeiffer, Guarneri, Wasielewski, etc. However, Funck's inoculation experiments, particularly the experiments whereby he was enabled to produce vaccinia by the inoculation of a single organism, appear of considerable importance, and their confirmation by other observers will be awaited with much interest.]

A Preliminary Note on the Cultivation of the Microbes of Vaccinia and Variola.—Copeman¹ introduced glycerinated vaccine-lymph into collodion capsules and placed them in the peritoneal cavity of rabbits and dogs. Afterward, on making film preparations of the contents of unruptured capsules and staining them with methylene-blue, in addition to flakes of epithelium, numerous zooglea masses were visible, made up of bodies resembling spores, only the periphery of which took the stain. Apparently they represented the resting stage of the specific microbe. The fluid contents from these capsules were found to be capable of inducing a typical vaccinia in the calf, although the contents of control capsules, placed in test-tubes partially filled with beef broth, and incubated at the body temperature, for periods varying from a week to a fortnight, gave no results. The presence of similar microorganisms, often in extraordinary numbers, has been demonstrated by Copeman and Fremlin in the epithelium of vaccinia vesicles in the calf, and also in human smallpox.

The Cause of Vaccinia.—After a careful study, Wasielewski² concludes that the vaccine bodies of Guarneri are unquestionably the cause of vaccinia. He succeeded in propagating an active vaccine in the epithelium of the rabbit's cornea up to the forty-eighth generation, proving its efficacy by inoculation of a calf and several children. As, aside from the vaccine bodies at the points of inoculation, no other organisms, particularly no bacteria, were present, the conclusion seems warranted that these bodies are the cause of vaccinia.

¹ Brit. Med. Jour., Feb. 23, 1901.

² Zeit. f. Hyg. u. Infektionskrankh., XXXVIII, H. 2.

The Microorganisms of Vaccine Material.—J. B. Buist¹ began 16 years ago to study the cause of vaccine opacity. In the course of bacteriologic investigations he obtained several different cultures, which, when calves or monkeys were vaccinated with them, did not cause any local reaction, but after about 6 days an eruption appeared over the back of the animals unassociated with any constitutional symptoms. The same picture was produced when cultivations from smallpox lymph were inoculated. Cultivation of the lymph had destroyed its power of producing constitutional symptoms. The turbidity he found to be due to cocci which he considers saprophytic organisms and contaminations.

The Corneal Cell Inclusions Following Vaccine Inoculation and Their Relation to Cell Inclusions of Malignant Tumors.—Gorini² describes the results of his examinations of corneas after inoculation with vaccine virus, with especial reference to the presence of an organism designated *Cytoryctes vaccinae*. This is believed to be a specific inclusion distinct from other cell inclusions and to bear a marked resemblance to the cell inclusions of malignant tumors.

Experimental Vaccinia.—Calmette and Guérin³ found that the inoculation of rabbits with vaccine material is always followed by a confluent eruption of small pustules, rich in lymph, provided the vaccine is not inserted into scarifications, but merely spread upon the freshly shaved skin. They found that the rabbit is an excellent animal for the control of the vaccine collected from calves and infants, as well as that conserved in glycerin. There was no propagation of the virus anywhere else than in the skin. The vaccine can be obtained aseptic—*i. e.*, in a state in which it will not give any microorganismal growth on culture media—by purifying it through a brief sojourn in the peritoneal cavity of rabbits that have in advance been injected with bouillon. The leukocytes of the animals cause the disappearance of the foreign microorganisms, but seem for a long time to respect the virulent elements of the vaccine.

The Histopathology of Yaws.—From a careful study of the histopathology of yaws MacLeod⁴ concluded that the following changes suggest that yaws and syphilis are different histologic entities: The plasma cells are not so definitely clustered around the vessels in yaws as they are in syphilis, nor do they ever form foci suggesting tuberculous nodules, as they occasionally do in syphilis. They are seldom arranged in rows as they frequently are in syphilis. Large multinuclear cells (chorioplagues) and true giant-cells, which may be present in syphilis, are absent. No hyaline degeneration, such as may be found in syphilis, is detected in the plasma cells. The rarefaction of the collagen is more marked in yaws than in syphilis; organization is not detected, and colloid degeneration, such as occurs in a syphilitic gumma, is absent. There is no tendency to thickening of the blood-vessel walls or to endothelial pro-

¹ Lancet, Nov. 17, 1900.

² Centralbl. f. Bakt., etc., XXVIII, 233, 1900.

³ Ann. de l'Institut Pasteur, vol. XV, No. 3, Mar. 25, 1901.

⁴ Brit. Med. Jour., II, 797, 1901.

liferation, such as is so frequent in syphilis. The proliferative changes in the epidermis in yaws are only equaled in syphilis in the condylomas, while the marked tendency of the stratum corneum (hyperkeratosis), which is an invariable characteristic in yaws, is unusual in syphilis.

Cultivation of the Estivoautumnal Malarial Parasite in the Mosquito—*Anopheles Quadrimaculata*.—Albert Woldert¹ caught many larvae of *Anopheles* near malaria-infected houses, thus confirming the observation, "where there is malaria, there are mosquitos." The reverse, however, was not found to be the case, as the mosquitos remain uninfected, unless they are able to feed upon a case of malaria. He raised upward of 200 adult *Anopheles* from the larvae. He accepts MacCallum's conclusions regarding the manner in which the malarial parasite propagates its species and gains admittance into the blood of man. He attempted to infect the mosquitos found around Philadelphia with the malarial parasite. Of 16 *Anopheles* and 1 *Culex*, which bit 7 malarial patients, only 1 became infected. This failure he explains on the ground that but 1 case contained the preflagellated type of the malarial parasite at the time the *Anopheles* bit, the variety which seems necessary for further fecundation, or that the insects had neither had a meal of blood yet, nor had been fertilized. [Both reasons have been advanced by others to explain their failures.] In another patient this flagellated form was found. Of 5 *Anopheles* which were permitted to bite him, one became infected and presented 4 zygotes in different stages of development near the lower portion of the middle intestine.

Malarial Parasitology.—Ewing² restricts the use of fresh blood to the study of the vital phenomena, such as ameboid movement, vibratory movement, and exflagellation. When the parasites are scanty, their detection is said to be much more certain in stained preparations; the failure to find them, therefore, in the native state should be followed by examining a specimen stained preferably by Nocht's method. For ordinary purposes the following stains are recommended: (a) A saturated alcoholic solution of alcoholic eosin, diluted with an equal part of 95% alcohol; (b) a saturated aqueous solution of Ehrlich's methylene-blue, at least 1 week old. It is believed that the nucleus of the malarial parasite is of the "distributed type"—that is, composed of granules of chromatin scattered through the protoplasm, without vesicular structure or limiting membrane. The "ringform" is a true ring, a form usually, but not necessarily, assumed by the parasite, and does not represent a vesicular nucleus. No clinical or morphologic evidence was found to support the view that there is more than one species of estivo-autumnal parasite. In 4 cases, many clear examples of conjugation were observed, and in many other cases, equally distinct, but less numerous, examples were observed indicating that the process is of frequent occurrence. It is believed that the evidence favors those who regard the existence of several species of malarial parasites as not yet proved.

Agglutination of the Blood of Malarial Patients.—In the

¹ Jour. Am. Med. Assoc., Mar. 2, 1901.

² Jour. of Exper. Med., v, 429, 1901.

course of some researches on malarial blood in man, Panichi and Monaco¹ found that it possessed agglutinating properties. They found that the serum or the blood of malarial subjects had the power to agglutinate the blood of normal or of malarial subjects. This agglutinative power was present in the incubation period, reached its maximum during the period of pyrexia, and decreased and disappeared when there no longer existed fever and parasites in the blood. If the blood in malaria is diluted with a physiologic solution of quinin, the agglutinating power is destroyed. In the nonmalarial subject quinin seems not to possess this property.

Demonstration of the Capsules of Bacteria.—Having observed that the mixing of agar cultures of bacteria with bouillon rather than with water renders the capsules distinct in many, but not in all, cases, Boni² attributed the failures to inconstancy in the species of the bouillon. To remedy this defect he employs a fluid composed of the white of 1 egg, 50 grams of glycerin, and 2 drops of formalin. These should be well shaken and filtered, and, for the finest investigations, also sterilized, as is blood-serum. The technic recommended is as follows: On a cover-slip or a glass slide a drop of this fluid should be placed and to it added a minute portion of an agar culture. This should be thoroughly mixed, the mixture spread out in a very thin layer, thoroughly dried by being held over a flame until steam no longer is given off, and when dry, covered with carbol-fuchsin for 30 seconds, washed in water, dried, and mounted in balsam. Boni emphasizes the fact that, contrary to the prevailing opinion according to which bacteria usually present capsules only when growing in the human or animal body, they also exhibit capsules when grown in fluid or solid media, and he suggests that possibly his method may permit the demonstrating of capsules about bacteria that heretofore have been thought devoid of capsules. Originally he was enabled to demonstrate the capsules of the pneumococcus, the typhoid bacillus, and the common colon bacillus, but in a later communication³ he states his ability to demonstrate a capsule about all varieties of bacteria. The method recommended is as follows: (1) Prepare the cover-slip preparation as already noted; (2) stain with carbol-fuchsin (20 to 30 seconds); (3) wash in water; (4) dry with filter paper; (5) contrast stain with Löffler's methylene-blue solution (4 to 6 minutes); (6) wash in water; (7) dry with filter paper; (8) mount in balsam. In a red field the capsules appear colorless and with a sharp contour, surrounding the bacteria which are of a deep blue color. Fresh cultures give the best results. It is suggested that the darkly stained central portion corresponds to a nucleus, and the colorless capsule, to the protoplasm of cells.

Staining Flagella.—For certainty and rapidity of results, Smith⁴ recommends the following modification of Pittfield's well-known method for staining flagella: A saturated solution of mercuric chlorid made by

¹ La Riforma Med., Jan. 24, 1901; Brit. Med. Jour., June 15, 1901.

² Münch. med. Woch., XLVII, 1262, 1900.

³ Centralbl. f. Bakt., etc., XXVIII, 705, 1900.

⁴ Brit. Med. Jour., 1, 205, 1901.

boiling should be poured while hot into a bottle in which crystals of ammonia-alum have been placed in quantity more than sufficient to saturate the fluid. The fluid should be well shaken and allowed to cool. To 10 cc. of this fluid 10 cc. of a freshly made 10% solution of tannic acid and 5 cc. of carbol-fuchsin should be added, and after being thoroughly mixed, the fluid should be filtered. The cover-glasses should be prepared by washing them in a strong solution of hydrochloric acid. They should be taken from the acid, wiped with a clean cloth, and heated over a Bunsen flame. On a cover-glass that has been sufficiently heated the film spreads with evenness. The traces of acid that are left on the glass make it easier to avoid subsequent precipitation of mordant and stain. The bacilli should be spread on the cover-slip and fixed, and the mordant then filtered, poured on the preparation, heated until steam is given off, and kept at this temperature for 3 minutes. Then it should be well washed in distilled water, the stain added, and heated as before for 3 or 4 minutes. The stain should be made by adding 1 cc. of a saturated alcoholic solution of gentian violet to 10 cc. of a saturated watery solution of ammonia-alum. This should be filtered before being poured on the preparation. De Rossi¹ directs that the cover-slips be cleaned with extreme care, and that an agar culture not more than 4 days old, and grown in the incubator, be used. A fine milky emulsion of the bacteria should be made with distilled water in a clean watch-glass, and a loopful of this mixed with $\frac{1}{2}$ cc. to 1 cc. of distilled water in a second watch-glass. A loopful of this should be placed, but not spread, on a clean cover-slip, and rapidly dried in a sulphuric acid exsiccator. The mordant consists of tannic acid 25 grams and 1% aqueous solution of caustic potash 100 cc. (dissolve by heat). The stain is Ziehl's carbol-fuchsin. On the cover-slip preparation that has not been fixed, place 1 drop of the mordant and 4 or 5 drops of the stain. This forms a precipitate which should be permitted to act for 15, 20, or 25 minutes, and should then be washed off with distilled water. Dry with bibulous paper and mount. Sometimes only portions of the preparation show the flagella well.

TOXINS, ANTITOXINS, HEMOLYSINS, SNAKE VENOMS.

The Bacterial Toxins.—V. C. Vaughan and Th. B. Cooley² are of the opinion that the specific poison constitutes a part of the bacterium, being formed within the organism itself. The pathogenicity of bacteria depends upon solubility and toxicity of the poison and the permeability of the cell-wall; the greater or less virulence upon the amount of toxin within the cell-wall. Toxins are proteids and alike chemically, but vary in stability of constitution, as is indicated by the difference in the effect of heat upon them. The toxins of the colon bacillus are not injured by exposure to 184° C., while diphtheria toxin is rendered inert by 60° C. They have not found much in

¹ Arch. per le Sci. Med., XXIV, 15, 1900.

² Jour. Am. Med. Assoc., Feb. 23, 1901.

literature bearing on their subject, but review at length the work of Buchner and Pfeiffer, whose results, they say, support their theories. Buchner concludes from his work that there is nothing in the whole category of decomposition products, caused by bacteria, to account for the phenomena of the general infectious diseases, but that the cause of these must be looked for in the albuminates of the bacterial cell itself, and that, in some cases at least, these poisons are only set free on the death and dissolution of the bacterial cell. He worked on pathogenic bacteria in general, Pfeiffer upon the toxins of the cholera vibrio. The authors performed some experiments with *Bacillus coli communis*, and draw from them the following conclusions: (1) The colon bacillus in virulent form contains within the cell a toxin which is fatal to guinea-pigs of from 200 to 300 grams weight, in quantities of less than 1 milligram. (2) The aqueous extract of the cells of the colon bacillus grown on agar is inert. (3) The entire germ is highly resistant to heat and to dilute acids and alkalies. (4) The cell-wall of the colon bacillus is digested by the prolonged action of artificial gastric juice, which does not alter the toxin. (5) The toxin, as thus obtained, is insoluble, or but slightly soluble, in dilute acid, but is slightly soluble in water and more readily in dilute alkalies. (6) This toxin responds to the ordinary proteid reaction. (7) The toxin, after being freed from the cell-membrane, is not destroyed by being boiled.

The Nature of the Action of Antitoxins.—Corbett¹ discusses at length the early views of Behring, Buchner, and Ehrlich; the argument based on the occurrence of increased sensitiveness to a toxin in animals during immunization; the question whether or not a mixture of toxin and antitoxin which is, in a certain dose, neutral for one animal, is neutral for every other animal; the reactions which take place between toxin and antitoxin outside the animal body; the attempts to separate toxin and antitoxin from one another after they have been mixed together; the law of multiples; the results of injecting toxin and antitoxin mixed together, compared with those of injecting the two substances separately into different parts of the animal; and the influence of the time during which antitoxin and toxin are allowed to be in contact with one another before injection. The facts in favor of a direct action of antitoxins upon their corresponding toxins are as follows: (1) Certain reactions have been observed to take place between these substances outside the animal body (venom, ricin, croton, tetanus toxin, eel's serum, and their corresponding antitoxins); (2) the success of various attempts to separate the active bodies from neutral mixtures has been shown, in some instances, to depend upon the fact that insufficient time for their complete union was allowed, separation being no longer possible when this was granted; (3) the accuracy of the titration of toxins and antitoxins to within 1% of error; (4) the fact that to save an animal from 1000 fatal doses of diphtheria toxin requires little more than a hundred times as much antitoxin as is required for 10 fatal doses; (5) the fact that the potency of antitoxin is greatly increased if it is allowed to come in con-

¹ Jour. of Path. and Bact., VI, 193, 1900.

tact with the toxin outside the animal body, and is, under certain circumstances, increased still further if allowed to remain for some time in contact with the toxin at a suitable temperature. The conclusions which Buchner and Roux drew from their experiments were based on a misconception, for they ignored the capacity of an animal to deal with a certain minimal quantity of toxin, and consequently made no distinction between a physiologically neutral and a completely neutral mixture. Corbett states, in addition, that at the outset of his inquiry he was inclined to accept the views of Buchner and Roux, but a prolonged and detailed study of the arguments and experiments that are reviewed and described gradually raised a conviction in his mind that the antitoxins of tetanus and diphtheria, of snake poison, of ricin, abrin, croton, etc., enter into direct chemie combination with their respective toxins—a combination that is perhaps not exactly comparable to that of an acid with an alkali; for, as is pointed out, it is a much slower combination, but one which possibly, as Ehrlich has suggested, more closely resembles the formation of a double salt. Thus it is believed that the views that Behring originally put forth require but little modification, and appear more firmly supported than ever by recent discoveries.

Proliferation and Phagocytosis.—F. B. Mallory¹ concludes that the effects of bacterial toxins upon tissues are manifested in one of four ways: (1) By degeneration or necrosis of cells; (2) by exudation from the blood-vessels; (3) by proliferation of cells; (4) by phagocytosis (the inclusion and digestion of cells by other cells). When toxins are strong, they cause degeneration, necrosis, and exudation; when weak, proliferation and phagocytosis; but the four processes may occur separately or in various combinations and proportions. This has been shown to occur in streptococcic and staphylococcic infections, diphtheria, and pneumonia. Typhoid and tubercle bacilli usually produce proliferation and phagocytosis, but when proper conditions for their growth exist, necrosis and purulent exudation may result. Epithelial and endothelial cells always proliferate by mitosis, and it is these new cells which are phagocytes; they incorporate polynuclear leukocytes, lymphoid and plasma cells, red corpuscles, etc., but never epithelial or endothelial cells. Connective-tissue reticulum is constantly forming between the new cells, but it is not easy to demonstrate that connective-tissue cells proliferate and become phagocytes. The reticulum seems to grow between the cells, because there is physical need of it. The proliferation of polynuclear leukocytes, lymphoid and plasma cells is of diagnostic significance in all sorts of infections. All the proliferated cells degenerate and disappear as soon as the causal agent is destroyed or neutralized; contraction and recovery of the tissue may then take place.

Plague Toxins.—Studies upon the question of toxin-production on the part of the plague bacillus have, according to Markl,² demonstrated that the bacillus is, under aerobic conditions, capable of producing a soluble toxin, which, when injected into animals, can give rise to a state

¹ Jour. of Exper. Med., v, Oct. 1, 1900.

² Zeit. f. Hyg. u. Infektionskrankh., XXXVII, 3, 1901, S. 401.

of immunity, with the development of a serum that is antitoxic, and even, to some extent, antiinfectious. If the animal is a goat, the proper time for bleeding it is between the third and the fourth week after the last toxin injection. In the serum obtained earlier than this there is still a toxic substance present, which can render nugatory the antitoxic action of the serum. By the combined immunization with toxins and dead bacilli a state of immunity against the toxin, as well as against infection, can be secured. A strange discovery was that heating a filtered culture to 70° C. caused it to lose its toxicity for mice, but not for rats, rabbits, or guinea-pigs. This would indicate that there is in the filtrate a mixture of two related plague toxins. That they are related is proved by the fact that it is possible to produce immunity with the heated filtrate. The antitoxic serum then obtained is devoid of toxic action, no matter when it is taken from the animal.

Antiplague Serum-therapy.—Calmette¹ says that in plague the portal of entrance may be through mouth or nose, giving rise to the primary pneumonic form, or it may be through the skin, following slight excoriations, or flea and bug bites, etc. Experiments have shown that fleas living on rats are probably the chief carriers to man. The plague bacilli multiply first in the lymph-channels, but even a few hours after the infection they are found in the blood, and in consequence in large numbers in the organs. Serum injection provokes their rapid destruction by phagocytosis. If done intravenously it is much more certain and quick than if subcutaneously. In the latter case, especially if the dose is small, some of the bacilli may escape and within a short time become accustomed to the strength of the serum; infection then goes on as before. The serum produces an artificial immunity against the disease. It may be used to anticipate the plague or to arrest the infection. The serum is obtained by vaccinating small animals with virulent cultures killed by exposure for 1 hour to 70° C. This artificial immunity is strengthened by inoculating them repeatedly with virulent cultures of plague bacilli. The serum thus obtained is capable of anticipating the plague or arresting the infection. Phagocytosis begins almost immediately after injecting the serum and within a few hours all the plague bacilli have disappeared, being swallowed up by the leukocytes. In man the process is absolutely identical. The temperature drops 4 or 5 hours after the injection; it rises again for 8 or 12 hours afterward, and then drops finally. The temporary rise corresponds to the period during which the bacilli disappear from the circulation, being swallowed up by the leukocytes. As a curative dose, 20 cc. must be injected intravenously; the injection must be renewed if after 24 hours there is still fever and the diagnosis has been made bacteriologically. As a preventive, 10 cc. is to be injected under the skin of the abdomen.

Measuring the Bactericidal Power of Blood for Clinical and Experimental Uses.—To determine quantitatively the bactericidal

¹ Lancet, 1454, Nov. 17, 1900.

power of the blood, H. E. Wright¹ suggests a method which depends upon mixing measured volumes of serum and of graduated dilutions of serum with cultures containing bacteria in a capillary pipet of known volume, incubating these cultures for several days, and then counting the number of colonies under the microscope. The results thus obtained are compared with the number of colonies grown upon an equal volume of gelatin culture diluted with an indifferent diluting fluid. The capillary pipets are made in the ordinary way, being bent at right angles near the proximal end and then graduated by means of a pipet of known volume (Gower's 5 mm. hemocytometer pipet) containing a colored solution. This known amount is transferred to the capillary tube and a mark placed on lower level of fluid; the fluid is permitted to flow through the pipet, a mark being placed at each point where the column indicates 5 mm. The capillary cultivations are made in a similar manner, but are not graduated. The blood is obtained from a prick of the finger, is permitted to clot, and then centrifugated. The cultures used are ordinary stab cultures in gelatin, incubated for from 12 to 18 hours at 22° C., melted, and mixed. The culture should not contain less than 50 nor more than 200 colonies in 2.5 mm. of gelatin. Not only should undiluted blood-serum be used, but also dilutions of 5, 10, 20, 40 times. The warmed capillary culture tubes are then loaded with equal volumes of serum and culture and for control purposes with indifferent diluting fluids and culture. A rubber teat provided with a capillary vent is attached to the cultivation tube and the culture is mixed with the serum by alternately causing the fluids to rise and to fall in the neck of the tube. It is then sealed and incubated for 2 or 3 days at 22° C. This peculiar style of mixing is for the purpose of preventing air bubbles from getting into the substance. The tubes are examined with rather low magnification, between two slides which have been made to adhere with sealing wax, the space between them being filled with Canada balsam or cedar oil. If these various precepts are obeyed carefully, the results will be very accurate. The blood of 50 normal individuals was examined. No cultures could be found in any twofold dilution; in only 6 were cultures present in dilutions of 10; 50% were sterile when diluted 20 times, 15% when diluted 40 times. Antityphoidal serums of high agglutinating power destroyed this bactericidal power almost entirely and made benefits derived from such therapeutic serums rather doubtful. Guinea-pigs inoculated with sterile cultures of typhoid bacilli showed after a time a definite increase in the bactericidal power of the blood.

The Origin of the Alexins in the Normal Serum.—Gengou² concludes that in the dog and in the rabbit the alexins are found in larger quantity in the polymorphonuclear leukocytes than in the serum, while the white corpuscles with a single nucleus seem to contain but small amounts. It is then fair to infer that the polymorphonuclear leukocytes are the source of the alexins in the blood-serum.

The Causes of the Bactericidal Action of Blood-serum.—The bactericidal action of blood-serum has been attributed by Buchner and

¹ *Lancet*, II, Dec. 1, 1900.

² *Ann. de l'Institut Pasteur*, XV, 2, Feb. 25, 1901.

his school to special chemie substances present in the serum, but Baumgarten and his pupils ascribe it to certain physical changes that are brought about when the bacteria are transferred from one medium to another. Hegeler,¹ however, from careful studies concludes that plasmolysis, as the physical phenomenon is called, as well as absence of nutriment, is not sufficient to explain the bactericide occurring in serum, and that this must be due to the presence of Buchner's alexins.

Experimental Contributions to the Knowledge of Natural Immunity.—Wassermann² gives, in a very concise and intelligible form, the main points regarding immunity, closely adhering to Ehrlich's theory in the premises. Ehrlich, it will be remembered, holds that immunity is due to the coaction of two bodies, one normally present, which he calls complement (the alexin of Buchner), and another, which he calls the "Immunkörper," which is specific and developed under the influence of external causes. Wassermann believes that the complements are intravital substances, of great moment in natural immunity. They are, however, not the only cause of natural resistance, for in certain cases of innate immunity their participation cannot, at present, be shown. The activity of specific bactericidal serums of the living organism depends upon the combined action of the complement of Ehrlich—that is, the alexin—and the "Immunkörper"—the *substance sensibilitrice* of Bordet. In the action of specific antitoxic serums the complements play no role. The active typhoid-fever immunity of the guinea-pig depends upon the circulation of the specific bactericidal immune serum in the body, and is, therefore, hematogenic, not histogenic. The complements are biologically not only bacteriolytic and cytolytic substances, but are proteolytic ferments in general. The complements of the serum are multiple, but several kinds are common to nearly all of the mammals examined. A positive, but not the sole, source of the complements is the leukocytes.

The Passage of Agglutinins from the Mother to the Fetus.—Schumacher³ concludes, from a study of the literature and from personal experiments, that the agglutinins of the maternal blood may pass to the fetus, but do not always do so. The latter is the rule when the typhoid fever has ended some time before conception. The infant's blood is also devoid of the property if the disease of the mother occurs during the first half of pregnancy, probably because, under these circumstances, miscarriage generally occurs. The agglutinating power, however, is never absent if the mother has had typhoid fever during the last months of pregnancy; but the power persists for only a short time in the newly born. The agglutinating action of the mother's milk, which is usually the same as that of the serum, is of no consequence to the infant, and generally does not produce the specific reaction in the blood of the latter. Only in cases in which, apparently by reason of catarrhal conditions of the intestinal tract, the latter has lost its normal

¹ Zeit. f. Hyg. u. Infektionskrankh., XXXVII, 1, 1901, S. 115.

² Zeit. f. Hyg. u. Infektionskrankh., XXXVII, 2, 1901, S. 173.

³ Zeit. f. Hyg. u. Infektionskrankh., XXXVII, 2, 1901, S. 323.

condition, do the agglutinins seem to be absorbed and utilized by the fetus. The blood-serum of healthy lactating women possesses an agglutinating power within the limits of the normal, while the serum of the newly-born infants presents this quality in but the slightest degree, and sometimes not at all.

Relation of Agglutinins to Protective Bodies.—Regarding the relation of agglutinins to protective bodies, Castellani¹ arrives at the following conclusions: Agglutinating substances and protective bodies behave alike toward chemic and physical agents. There is no parallelism between the development of the agglutinins and the immunizing power in the living body. In immunized animals the serum during the first few days is always richer in agglutinins than the spleen, while the latter contains more of the protective bodies. Although the two qualities are acquired almost simultaneously, that of agglutination is lost first. The serum of an animal immunized toward a certain micro-organism may exhibit a strong agglutinating power toward other organisms as well, without, however, developing immunizing properties toward them. Agglutinins may be developed in the bodies of animals inoculated with certain bacteria, without the simultaneous development of protective bodies. From these results it would appear that there can be no very intimate relation between protective and agglutinating substances.

Poisonous Snakes and Snake Poisons.—Gustav Langmann² discusses the varieties of poisonous snakes and their distribution throughout the world. The poison gland is situated behind the eyes and is the homologue of the parotid gland. It is a compound racemose gland and produces an albuminous secretion. The poison is acid in reaction, greenish-yellow to deep orange in color, viscid, variable as to turbidity; odor characteristic; specific gravity 1.030 to 1.077; the solids vary from 12% to 67%; microscopically it contains epithelial cells and a few granular amorphous masses. It is perfectly sterile. Two poisonous principles are contained in it, venom-peptone and venom-globulin. Both of these are albuminoids; their proportions differ in different snakes, and the poisons themselves vary in toxicity. The toxicity is retained for years in dried and glycerinated venom. It is almost impossible to destroy the toxicity by freezing, heat, etc. The peptones produce slight local edema and severe nervous symptoms—irritation, twitching, convulsions, and paralyses, especially of the respiratory center; the globulins incite local reaction with hemorrhage around the point of injury and in the mucous membranes, and destruction of the coagulability of the blood. The symptoms following the bite of a cobra may be likened to an acute bulbar palsy of the most furious type, the viper bite to an acute ascending spinal paralysis, the last stages exhibiting bulbar symptoms and inhibition of respiration, thus establishing the fact that snake venoms, like these diseases, affect the motor ganglia of the anterior horns and chiefly of the oblongata. Like

¹ Zeit. f. Hyg. u. Infektionskrankh., XXXVII, 3, 1901, S. 345.

² Med. Rec., Sept. 15, 1900.

other poisons, they also produce fatty degeneration of the liver, cholecystitis, nephritis, pneumonia, etc. Regarding the coagulability of the blood, this is increased primarily after an intravenous or hypodermic injection, a negative phase following secondarily. Coagulation is due to a nuclealbumin formed by the action from the stroma of the destroyed erythrocytes and the endothelium of the blood-vessels. Sudden massive thrombosis may produce death. If death is early, thrombosis is usually its cause; if during the first 24 hours, respiratory paralysis; if later, general paralysis; if days or weeks after the bite, it is due to sepsis, the blood being robbed of its germicidal properties by the poison.

The Identification of the Blood of Individuals.—W. H. Birchmore¹ describes a method by means of which he claims to be able to distinguish between the blood of different individuals. Knowing that red corpuscles vary in size, he measured a certain number of blood-cells of an individual, taking notes of their size, and the number of each size. The average number of corpuscles of any given size was practically identical throughout each individual series, and the individuality of each series was unmistakable and unquestionable. When repeating the tests at other times, the curves representing each one set of measurements could not be confounded with each other. In no case were all the curves in one group identical, but the differences were quite insignificant when compared with the average curve of that group; and the difference between the averaged curves was marked indeed. The importance of absolute uniformity in the tests is emphasized.

The Mechanism of Globulolysis.—In a series of studies upon the phenomenon of cytolysis, Nolf² comes to the conclusion that globulolysis by chemie agents is due to the property of the latter of augmenting the affinity of the cell for water. This excessive hydration brings about a transformation in the permeability of the red corpuscles, which permits the diffusion of the hemoglobin into the surrounding medium. The alexins, Nolf believes, are not proteolytic ferments, but act in hemolysis like chemie agents. The antibodies favor the action of the alexins by fixing them in larger quantity upon the body of the red corpuscles.

The Principles of Detoxification.—Von Czychlarz and Donath³ conclude, what is now generally conceded, that the liver possesses the power to diminish the toxic properties of different alkaloidal and other poisons. To determine whether this power really belongs to the liver and whether a similar power is possessed by other organs, they performed 3 series of experiments—71 in number. In the first series, mixtures were made of strychnin and different organs (liver, spleen, kidney, brain, and blood), and the mixtures were injected into lower animals. It was found that the poison was deprived of some of its toxic property; the loss being the greater, the longer the organ emulsions were permitted to act on the poison before being injected into

¹ N. Y. Med. Jour., July 7, 1900.

² Ann. de l'Institut Pasteur, Sept., 1900, p. 656.

³ Zeit. f. Heilk., XXII, 1, 1901.

the animals. There was no marked difference in the detoxifying power of the different organs. It was noted, however, that the richer the emulsion in cellular elements, the greater was the reduction of the poisonous power of the strychnin; whole blood also was active, whereas emulsions poor in cells and blood-serum were inactive. In a second series of experiments, the liver, immediately after it was removed from the body of an animal, was deprived of its blood, and a solution of strychnin passed through it for a certain time. The strychnin solution then was injected into other animals, with the result that it was found to have lost considerable of its poisonous properties. Thus it was demonstrated that detoxification is a property of the tissues, and that it is brought about without the intervention of the blood. In a third series of experiments, after ligating an extremity of an animal, strychnin in toxic doses was injected into the extremity. No ill effects resulted after the removal of the ligature at the end of 4 hours, demonstrating that during life detoxification may be brought about through contact and interaction of the tissues and the poison. From the results of the experiments it is concluded that the liver does possess the power to reduce the poisonous properties of strychnin, but that this power is not characteristic of the liver alone, being possessed also by other organs. In another communication Czyhlarz¹ details the results of another series of experiments whereby it was ascertained that a supply of oxygen to rabbits lessened the severity of strychnin convulsions, and that deprivation of oxygen (asphyxiation) resulted in the death of an animal to which a dose of strychnin had been given that would have been borne without discomfort by a normal animal. Again it was ascertained that when strychnin was injected into a previously ligatured leg, and the leg amputated after 8 hours, not more than one-half of the injected strychnin could be recovered; and that after expressing the blood from a leg by means of an Esmarch bandage, the effect of strychnin injected is less than it would otherwise be. The injection of gradually increasing doses of strychnin did not give rise to a tolerance for the drug; death followed immediately upon the injection of a lethal dose. In another series of experiments a certain quantity of strychnin was administered daily to hens, the excrement was collected, and ultimately the hens were killed and the carcass and the excrement were examined quantitatively for strychnin. As the major portion of the strychnin could not be recovered, it was concluded that it either had been destroyed or had altered in the tissues.

Frequency of Trichinosis in the United States.—Williams,² as a result of a collective investigation of the question, states that microscopic examination of pieces of muscle secured at 505 unselected necropsies on human adult subjects revealed trichinas present in 27 (5.3%). As all of the subjects died of diseases other than trichinosis, the infection with trichinas must have occurred in every case some considerable time prior to death. The trichina infection varied much in

¹ Zeit. f. Heilk., XXII, 156, 1901.

² Jour. of Med. Research, new series, 1, 64, 1901.

severity, being sometimes very extensive and sometimes so slight that only one or two worms were detected. The birthplaces of the subjects included the most important countries of North America and Europe. The number of cases was not large enough to allow accurate conclusions to be formed as to the influence of nationality upon the frequency of the disease. The fact that a large percentage of cases occurred in subjects that had been born and had lived in the United States (2.89% whites, 7.14% colored) is important. An unusually high percentage occurred among subjects that had been insane. Examination of the sections for eosinophile cells failed to reveal them about or near the encapsulated trichinas. It was found that mast-cells do not collect in or about the capsules in cases of old trichinosis, and that plasma-cells and new-formed elastic fibers do sometimes form in or about the capsule. The capsule may be invaded by new cells, become filled with fibrous and adipose tissue, the worms disintegrating. From this study it appears that many cases of old trichinosis escape detection at necropsy. A large number of the statistics quoted is probably based upon naked-eye diagnoses, by which only the severe forms of the disease would be recognized in a routine examination. Leuckart, Virehow, Pagenstecher, and others remarked 30 years ago that trichinosis would be found at necropsies quite commonly if searched for. Williams does not claim that his figures represent the actual frequency of trichinosis in the United States; this can be ascertained only by examining a large number of statistics. Similarly, it is not intended to argue from the results quoted with regard to the relative frequency of trichinosis in the United States as compared with other countries; but attention is directed to the fact that the lesions in trichinosis may vary considerably in severity and in extent, and that the disease occurs among native-born Americans as well as among those of foreign birth.

The Poison of Tapeworm.—Messinco and Calamida¹ believe that the effects of tapeworm are due not so much to mechanical influences as to some toxic substance contained in a secretion of the tenia itself. They found that by injecting extract of tapeworm constant and characteristic symptoms were produced; for example, tremor, depression, paresis of the posterior extremities, somnolence, etc. Control experiments showed that the results were not due to the injection of proteid substances merely, but to substances especially connected with the tapeworm. All species experimented with gave similar results.

Entrance of Ankylostoma Embryos into the Body through the Skin.—Sandwith² records some observations that go to show that Ankylostoma embryos may enter the human body by passing through the hair follicles.

¹ La Riforma Med., July 17, 1901; Brit. Med. Jour., Oct. 26, 1901.

² Brit. Med. Jour., II, 690, 1901.

TUMORS.

The Etiology of Carcinoma.—The study of carcinoma continues to engage the serious thought of investigators in all parts of the world. Recently Behla¹ has published a collection of the literature of the subject; Sailer,² a critical summary of the literature on the inoculability of carcinoma; and Kelly,³ a critical summary of some recent literature on the etiology of carcinoma. The asserted increasing prevalence of carcinoma still attracts attention, having been commented upon recently by Newsholme,⁴ Payne,⁵ Barling,⁶ Jackson,⁷ Maeder,⁸ Park,⁹ and others. The influence of local conditions on the etiology of carcinoma, a subject previously commented upon by Haviland, Powers, etc., is the subject of a report by a committee of the Birmingham and Midlands (England) Counties Branch of the British Medical Association,¹⁰ appointed to inquire into the influence of locality on the prevalence of malignant disease. The committee found that there are certain areas in which the mortality from malignant disease is not noticeably above, and others in which it is markedly below, 0.58 per 1000 per annum, the average for England and Wales. The physical conditions found where carcinoma prevails are contamination of the soil with sewage and general lack of drainage. There seemed to be no connection between the geologic character of the subsoil and the prevalence of carcinoma, a connection insisted upon by Haviland. Evidence is adduced that there is a special tendency to the occurrence of malignant disease in certain houses and groups of houses, and, on the whole, carcinoma is reported to be more prevalent in old houses and districts than in new houses and districts. The endemicity of carcinoma and the influence of local conditions on the prevalence of carcinoma have been the subject of inquiry also by a number of investigators—Graf, Behla, Arnau-det, Noel, Newsholme, Blake, Nason, Haviland, Jones, etc.¹¹

Of the many communications on the **supposed parasite of carcinoma**, those of Sanfelice,¹² Roncali,¹³ Plimmer,¹⁴ Bra,¹⁵ Sjöbring,¹⁶ Schüller,¹⁷ and Gaylord¹⁸ are deserving of especial mention. San-

¹ Die Carcinomliteratur—eine Zusammenstellung der in- und ausländischen Krebschriften bis 1900, mit alphabetischen Autoren- und Sachregister. 259 pages. Berlin, 1901.

² Am. Jour. Med. Sci., CXX, 190, 1900.

³ Univ. of Penna. Med. Bull., XIV, 287, 1901.

⁴ Practitioner, LXII, 371, 1899.

⁵ Lancet, II, 765, 1899.

⁶ Brit. Med. Jour., II, 1261, 1898.

⁷ Brit. Med. Jour., II, 1465, 1899.

⁸ Zeit. f. Hyg., etc., XXXIII, 1900.

⁹ Tr. Med. Soc. of State of N. Y., 239, 1899; 245, 1900; Buffalo Med. Jour., LV, 559, 1900.

¹⁰ Birmingham. Med. Rev., XLVII, 257, 334; XLVIII, 12, 1900.

¹¹ For references consult Kelly, *l. c.*

¹² Zeit. f. Hyg., etc., XXI, 32, 394, 1895; XXII, 171, 1896; XXVI, 298, 1897; XXIX, 463, 498, 1899.

¹³ Centralbl. f. Bakt., etc., XXI, 517, 1897; XXIV, 61, 158, 212, 306, 353, 1898; Internat. Clinics, I, 1901.

¹⁴ Practitioner, LXII, 430, 1899.

¹⁵ Ann. de l'Institut Pasteur, XV, 49, 1899.

¹⁶ Centralbl. f. Bakt., etc., XXVII, 129, 1900; Arch. f. klin. Chir., LXX, 93, 1901.

¹⁷ Centralbl. f. Bakt., etc., XXVII, 511, 1900.

¹⁸ Am. Jour. Med. Sci., CXXI, 503, 1901.

felice, in his latest paper, writing of *Saccharomyces neoformans*, the name he has given to the organism isolated by him from a number of carcinomas, states that it may present itself in the tissues in two forms. In the one it possesses a capsule and can be cultivated in artificial media; in the other it possesses no capsule, resembles completely Russell's fuchsin bodies, and cannot be cultivated in artificial media. It is said that when this organism in pure culture is introduced into the organs of dogs, it may result in the production of epithelial tumors similar to malignant epithelial tumors in man. If, however, the organism be introduced into the veins of dogs, cats, or sheep, it results in the production of connective-tissue tumors. These results, according to Sanfelice, justify the supposition that it is not with two different groups of parasites that we have to deal, but that the same parasite, depending upon the variety of cellular elements with which it comes in contact, is able to give rise to a connective-tissue tumor, on the one hand, and to an epithelial tumor, on the other hand. Roncali, in his latest paper, expressing his adherence to the embryonal (Durante-Cohnheim) theory of tumor formation, states that it is perhaps necessary to restrict somewhat its significance and to limit its applicability to certain special varieties of tumors—dermoid cysts, benignant organoid tumors, and tumors derived from tissues that normally are not present in the parts wherein they grow. He believes that it is difficult to understand how neoplasms can be malignant without some extraneous agent—that is, a parasite; that, as a matter of fact, in malignant tumors of man and animals there occur within the cells and in the connective tissues certain bodies that are not due to cell degeneration, but are derived from something extraneous to the animal tissues; that morphologically these bodies are identical with the so-called coccidia that have been described by various observers as inclusions within the cells of epithelioma and sarcoma; that they are identical with certain blastomycetes that may be made to produce tumors in the tissues of animals by experimental inoculations; that the bodies found in human tumors resist acids and alkalis in the same way as do the blastomycetes that exist in the tissues of animals as a consequence of inoculation; that these bodies occur only in malignant neoplasms, and only at the periphery—that is, as the parts especially concerned in the growth of the tumor, never at its center; that these bodies which can be obtained in pure culture from malignant neoplasms of man and animals are blastomycetes; and that inoculated into lower animals they may produce tumor formations. Plimmer's work is well known and need scarcely be referred to in detail. Bra was able to isolate from a number of tumors an organism that he has placed among the ascomycetes. It is described as being spheric in outline, rarely cylindric. It multiplies chiefly by sporulation, and sometimes forms mycelia. Inoculations of pure cultures of the organism into rabbits and dogs are said to have resulted in the development of fibrosarcomas from which the ascomycetes could be recovered. Bra also reports that he was able to secure the organism from the blood of a cancerous patient that had marked cachexia. Sjöbring, examining 30 tumors, was able to isolate an organism that he describes as a rhizo-

pod. The forms are many and variable, but in general three (with many transition-forms) may be distinguished: (1) Ameboid forms; (2) typical rhizopods, and (3) involution (or permanent) forms. In a small series of inoculation experiments four positive results were obtained, a cylindric-celled carcinoma, two epitheliomas, and a multilocular colloid cystoma being produced. Schüller was enabled to isolate from sarcomas and carcinomas a roundish or ovoid, rarely irregular, vesicular parasite, at least three times as large as a red blood-corpuscle, highly refractile, and of a golden-yellow color. It consists of a relatively dense, resistant, refractile capsule of light color, with dark and sometimes granular contents. Examination of living cultures in the hanging drop reveals that the young forms possess fine peripheral processes resembling cilia. The organisms can also be seen in the tissues of the tumors, especially in teased unstained preparations. However, they may be demonstrated also in stained preparations, especially well in preparations stained in very weak solutions of alum-hematoxylin or alum-carmin. In a later communication¹ more details as well as the results of certain animal inoculations are given. [Schüller's statements have not gone unchallenged. Voelcker and Hauser contend that what Schüller calls parasites are nothing more than cork-cells that accidentally contaminated his preparations. As Hauser is friendly to Schüller, and made the criticism after examining Schüller's own preparations, the latter's discovery has been placed in a questionable position.] Gaylord, announcing the discovery of the protozoon of carcinoma, describes the results of a long series of experiments—experiments that comprise the examination of a large number of tumors in the fresh state and in stained preparations, the cultivation in artificial media of the so-called protozoon, and the inoculation into lower animals of the protozoon with the subsequent production of tumor formations, and the isolation therefrom of the same microorganism. Originally he detected, in the ascitic fluid of a patient suffering from adenocarcinoma of the peritoneum, an organism that later was identified with the so-called Plimmer's bodies. Subsequently it was ascertained that all the organs, including the blood, taken from all regions of all patients dying from cancer, including sarcoma and epithelioma, contain large numbers of the organism. It was also found, in all cases of sarcoma and carcinoma thus far examined in which cachexia was well marked, that the organisms, especially the younger forms, can be detected in the peripheral blood. The organisms are of several forms: The small, highly refractile form, which, in suspension, possesses a characteristic oscillating motion; the larger, pale forms, projecting pseudopodia, and the saccular forms containing highly refractile spherical bodies are said to be detected with equal facility in the fresh scrapings of any malignant tumor. The small form of the organism, which so closely resembles fat, and the larger spherical forms containing fine granules are particularly abundant. It is said that by incubating hanging drop preparations of fresh scrapings from cancer the smaller forms can be followed in their development, during which they

¹ Die Parasiten d. Krebs u. d. Sarkoms, 1901.

grow in size and finally become granulated, and, if kept on a warm stage, ultimately throw out pseudopodia, develop a nucleus, and end by turning into a sac containing the spores of the organism. Additional details are promised in a later communication.

As opposed to the writers already mentioned, a number of investigators either report series of **inoculation experiments that yielded negative results** or they interpret the so-called cancer parasites as different forms of cellular degeneration (Sternberg,¹ Nichols,² Greenough,³ Borrel,⁴ etc.). Borrel gives a good review of the literature of the question and concludes that the so-called cancer parasites are the result of certain peculiar changes that occur in the attractive sphere about the centrosome of the cancer cells. Sailer gives a very good review of the literature and concludes that the transmission of malignant tumors from one animal to another of the same species appears to be definitely established by the work of Hanau, with its subsequent careful histologic control by Jenny, by the work of Eiselberg, and particularly by the elaborate experiments of Moreau. The transmission of tumors to the lower animals from human beings may be regarded as absolutely impossible unless some profound modification in technique or in the preparation of the animals subjected to the experiments shall be devised, and at present there is no reason to believe that any modification with which we are likely to become acquainted in the near future will suffice for this purpose. The results are invariably doubtful; not a single positive experiment has been carried out with precautions regarding the histologic nature of the growth and its development in the lower animals that would render it worthy of a moment's consideration. There is no reason to believe that cancer tissue introduced into the lower animals acts in any respect differently from any other tissue introduced into the lower animals. It produces the same effects and suffers the same changes. The effects of mediate inoculation are very doubtful. Certainly none of the bacteria that have been described need be regarded as etiologically associated with cancer. On the other hand, there is apparently slightly more evidence to prove that certain blastomycetes can, under favorable circumstances, produce proliferation of the cells with which they may be in contact, but this proliferation is apparently in the majority of cases endothelial and not epithelial in character. It was to be expected that the transmission of cancer from one human being to another would be successful in view of the successes of similar transmissions in the lower animals. Aside from the reports of Cornil and Hahn, however, even this experiment appears to have failed. The negative results, at any rate, at present certainly outweigh the positive results.

Foulerton,⁵ writing of the **pathogenic action of blastomycetes**, discusses the blastomycetes pathogenic to man, spontaneous blastomy-

¹ Ziegler's Beitr. z. path. Anat., etc., XXV, 554, 1899.

² Jour. Boston Soc. of Med. Sci., v, 1900.

³ Jour. Boston Soc. of Med. Sci., v, 59, 1900.

⁴ Ann. de l'Institut Pasteur, XV, 49, 1901.

⁵ Jour. of Path. and Bact., VI, 37, 1900.

cetic infection in animals lower than man, experimental inoculations in lower animals, his personal experimental inoculations with various yeasts, intraperitoneal inoculations, the anatomic results of yeast infection, and the theory of the blastomycetic causation of malignant disease. He expresses the opinion that from the evidence available we can only say that it is not improbable that some, at least, of the cases which on clinical and histologic grounds are now classified among the sarcomas may prove to be really cases of yeast infection; but as to the exact causation of tumors we are still absolutely ignorant.

Lack ¹ states that he has given up the view generally held, that carcinoma develops from an excessive growth of epithelium provoked by some stimulus, such as a parasite, the resulting prolific epithelial growth penetrating into the tissues. On the other hand, he has come to believe that carcinoma is simply the result of the entrance of the normal epithelium into the lymphatic spaces and its continued growth therein. He endeavored to demonstrate the correctness of his opinion by incising *in situ* a healthy ovary of a rabbit and permitting the juice scraped from the section surface to flow over the peritoneum. At the end of a year there had developed an extensive columnar cell carcinoma of the peritoneum with metastases in different organs. Lack is of the opinion that the operation produced the carcinoma, as, according to Macfadyean, the rabbit is not susceptible to carcinoma. He is also of the opinion that the implantation of malignant disease in the wound made for the cure of the disease is the real cause of many recurrences. [Despite the mass of contradictory evidence, impartial observers must still admit that the proposition that carcinoma and malignant tumors in general are due to parasites remains unproved, and there are many facts known that speak against the likelihood of its ever being proved—at least with our present methods of investigation. The one fact that does appear to stand out apart from all others is that some malignant tumors currently classed as sarcomas may be the result of parasitic (probably blastomycetic) infection.]

Preliminary Report on the Presence and Nature of Parasitic Amebas (Cancrionæba Macroglossia) in Epithelial Carcinoma.

—Gustav Eisen ² describes an organism which he considers the cause of carcinomas, and calls *Cancrionæba macroglossia*. He found it in practically all carcinomas. The organism discovered by Plimmer is identical with the spores of the *cancrionæba*, and contracted parasites have repeatedly been taken for cell degenerations, cornifications, etc. To differentiate the ameba it is necessary to fix it while still alive and at body temperature; even at room temperature the ameba will contract, losing its characteristic form. The fixing solution used contains potassium bichromate 3 parts, glacial acetic acid 5 parts, water 100 parts. This is employed warm and kept warm for some time after pieces are thrown in. After fixation (12 hours) the pieces are washed in running water for 12 hours and then hardened in alcohol, embedded in paraffin, and stained with eosin and methylene-blue. The parasites

¹ Jour. of Path. and Bact., VI, 154, 1900.

² Med. Rec., July 7, 1900.

vary in size from 7 to 30 μ , are variable in shape, and capable of sending out pseudopods. The protoplasm is granular, the nucleus large and homogeneous. They are present in large numbers in the cell-nests, lying in free spaces, which represent epithelial cells that have been eaten up. One ameba may be attacking three cells at the same time, the pseudopods acting for purposes of locomotion and suction. Propagation is by means of spores and amitotic division. In sporulation a fragment of the nucleus always accompanies the spore. The appearance of the canceramebas produces at once a rapid proliferation of the epithelial cells, they fencing in the organism to prevent its further spread into the tissues. In this way the cancer-nests are formed. The flattened and lunate shape of the epithelial cells nearest the center is due to direct pressure of the parasite. In the struggle between the two the epithelial cells may win occasionally, causing the ameba to succumb and remain encysted, but in the majority of cell-nests the parasites win and escape to other parts for further attacks. The leukocytes do not enter into the struggle at all. The increased hardness of the tissues containing the cancer plugs is due to the retention of the cell-walls after absorption of the cytoplasm and to a peculiar cornification of the epithelial cells surrounding the animalcule. Eisen concludes that *Canceriamœba macroglossia* is the cause of the formation of the cancer-nests, and as it is found in all epithelial carcinomas, probably the cause of the carcinoma itself. [The evidence is, of course, inadequate for such a conclusion; not until the discoverer cultivates the organism and reproduces the disease is he warranted in his claims.]

Presence of New Elastic Fibers in Tumors.—Alice Hamilton¹ used Weigert's stain to investigate the participation of elastic fibers in the formation of neoplasms. In fibromas of the subcutaneous tissue and myofibromas of the uterus they were present in small numbers, but probably not increased. In adenofibroma of the mammary gland they had increased notably, but did not form a conspicuous element. In scirrhus carcinoma of the pancreas, mammary gland, and liver they were found in large numbers. The richest growth, however, was found in the soft, malignant tumors of epithelial origin—adenocarcinomas of uterus, stomach, and mammary gland. Fibrosarcomas and alveolar sarcomas also contained very many fibers. As to their origin Hamilton will not commit herself, but has noted that the largest numbers are found where the stroma is comparatively rich in connective-tissue cells, indicating probably that the cells play an important part in the formation of these fibers.

The histogenesis of epithelioma formed the subject of a discussion by the Pathologic Section of the International Congress in Paris in August, 1900. Ilava² defined epithelioma as a pathologic increase of the cells of existing or aberrant epithelium. The cells multiply and penetrate into the connective tissue and into the vessels, whence they produce metastasis. The cause of these phenomena is not to be found in

¹ Jour. of Exper. Med., v, Oct. 25, 1900.

² Centralbl. f. allg. Path. u. path. Anat., 1900, xi, 615.

inflammatory processes, nor in disturbance of the physiologic harmony of the tissues, nor in a parasitic agent. The cause is still unknown. He looks upon endothelioma as a cancerous growth. Babes denies that any of the parasites described has a specific relation to carcinoma. He thinks that the question of "terrain" (*i. e.*, soil) is of great importance. The view that under certain conditions—as, for instance, chronic irritation—a development of cell varieties takes place, might facilitate the interpretation of carcinoma histogenesis. Every stimulus acting upon a prepared epithelial tissue (*i. e.*, one capable of irregular and excessive growth) is capable of producing carcinoma.

The Pathogenesis and Histogenesis of Malignant Tumors.—

Brosch¹ details at length theoretic considerations and his experimental researches with regard to the traumatic origin of tumors. He first of all draws attention to the fact that it is quite possible that tumors should result without the intervention of parasites, and he comes to the conclusion that the real cause of tumor formation is a destructive process acting upon a tissue the seat of productive processes. By productive process he understands the new formation of cells that in number and in power of proliferation exceed the limits of physiologic requirements—wound healing, inflammation, and the formation of benign tumors. The marked distinction between these productive processes and regenerative processes is that in the productive processes the cells are endowed with extraordinary powers of proliferation. The formation of a tumor is explained in this manner: A trauma is followed by productive process; now, if to this another trauma is added, a tumor results. Brosch also endeavors to establish the hypothesis that superficial injuries (bruising, burns, etc.) are followed by carcinomas, whereas deep and more severe injuries (blows, falls, etc.) are followed by sarcomas. The common occurrence of carcinomas in advanced life may be accounted for by the fact that elderly persons are less subject to severe injuries than are younger persons. The injuries of the aged thus are superficial, and the resulting tumors are carcinomas. By the experimental rubbing of paraffin into the skin of guinea-pigs Brosch was able to produce epithelial proliferations that appeared to be indistinguishable from the early stages of carcinoma formation, as depicted by Ribbert.

The Position of Malignant Adenomas Among Tumors.—Hanse-mann² points out that by malignant adenoma is understood a tumor of glandular structure, that invades and destroys the surrounding tissues and gives rise to metastases of similar glandular structure. Clinically it runs a course like that of carcinoma. Its relations to carcinoma may be studied best in the adenomas of the colon, owing to the characteristic differentiation of the epithelium into beaker cells. There are destructive adenomas of the colon in all parts of which beaker cells may be seen; in the metastases of such tumors beaker cells may or may not be found. If the tumor recurs after removal, beaker cells may or may not be present. Such adenomas with beaker cells reveal but the slightest histologic variation from the normal mucous membrane. But there

¹ Virchow's Arch., CLXII, 32, 1900.

² Virchow's Arch., CLXI, 453, 1900.

are some malignant adenomas of the colon which from their beginning contain no beaker cells, and in the metastases and recurrences of which no beaker cells are to be found. It is pointed out that in certain tumors the glandular structure is manifest in the primary growth, as well as in the metastases and recurrences, but that more frequently the metastases and recurrences show a gradual transition to cylindric-celled carcinoma, or even to medullary or colloid carcinoma. To this transition or alteration in character of the growth the term "anaplasia" is given. [That this anaplasia may occur in any tumor must be admitted, though in some tumors it may be manifest not so much in the form of the cells as in their course and manner of spreading. It is evident, therefore, that while these tumors often preserve their original structure in the metastases and in recurrences, they do not always do so; they are not as the carcinomas, always carcinomas, nor as the sarcomas, always sarcomas. They are to be differentiated from carcinomas, from which they differ only in degree, not in principle. Though it is convenient to retain the designations malignant adenoma, adenocarcinoma, etc., these growths should not be given the dignity of a special form of tumor.]

The Histology of Perithelioma of the Carotid Gland.—The carotid gland is a small organ of obscure nature lying at the bifurcation of the common carotid artery, a little nearer to the posterior surface of the internal carotid. Embryologically it appears at a time when the thymus and the thyroid are already fully developed. It is not of epithelial, but perithelial origin; that is, it springs from the primary vessel anlage. Von Heinleth¹ reports a tumor of this gland in a woman of 60 years. The history seemed to show that the tumor had existed for 37 years when it was removed. It projected from the left side of the neck, below the angle of the jaw, and was distinct from the goiter that was also present. Microscopically it had the characters of a perithelioma.

Liver Cavernomas.—Schmieden² reviews the different theories that have been advanced to explain the causation of cavernomas of the liver—tumors that have been referred to primary proliferation of the connective tissue, to congestion, to primary atrophy of the liver-cells, to obstruction to the flow of the bile, and to hemorrhage. He reports the results of his investigation of 32 cases of liver cavernomas and of 13 livers that presented appearances suggestive of cavernomatous formation. In his opinion none of the aforementioned theories is tenable. On the contrary, he believes that cavernomas of the liver should be ascribed to defects of the anlage,—to a local tissue transposition or constriction and segmentation or a defect in the germination of the liver anlage,—evidences of which are said to be detectable in the newborn. Referable, therefore, to aberrant rests, they assume their definite tumor status through secondary, principally retrogressive, alterations. They are distinct from cavernous angiomas of other organs—the skin, for instance—which are true blood-vessel tumors. The name "angioma

¹ Centralbl. f. allg. Path. u. path. Anat., 1900, XI, 599.

² Virchow's Arch., CLXI, 373, 1900.

hepatis," therefore, is not appropriate; rather should these tumors be designated "cavernomas" or "*naevi cavernosi hepatis*." They do not increase in size by spreading to the adjoining normally developed tissue of the liver. Their first anlage is introduced into the blood-vessel system of the liver, and they remain associated with all three of the blood-vessels of this organ. They may occur at any age, and have been observed in the embryo. They have very little tendency to sudden increase in size as have malignant tumors. The cavernoma of man is believed to be identical with that of the lower animals.

Congenital Sarcoma of the Liver and Suprarenal Gland.—Pepper¹ reports a case of congenital sarcoma of the liver and suprarenal occurring in a female child, aged 6½ weeks at the time of death. A review of the literature revealed reports of 5 cases of striking similarity. The points of interest and similarity are the occurrence of symptoms at or very soon after birth; the early death of the patients, none living longer than 16 weeks; the extreme rapidity of the tumor growth; the sex of the patients, 5 being females, and the sex of the other not being mentioned; the clinical manifestations—abdominal distention, wasting, absence of ascites, of jaundice, of marked pain, of fever, and of evidences of syphilis; infiltrative proliferation of the sarcoma tissue with practically complete destruction of the entire normal liver tissue; the hemorrhagic character of the growth in the suprarenals; the absence of involvement of any other organs or tissues. In the case reported, as well as in another case, the tumor was a lymphosarcoma; in 3 cases a round-cell sarcoma, and in 1 case a myxosarcoma. In 3 cases the tumor was thought to have originated in the liver; in 2 cases, in the right suprarenal. By way of contrast a table of 43 cases of primary sarcoma of the suprarenal is appended to the report. These are entirely dissimilar from those of which the one reported in detail is an instance.

An adenocarcinoma of the liver with ciliated epithelial cells is reported by Sokoloff.² The cilia were even manifest in some of the metastases. It is thought that the tumor originated in the liver, and from the bile-ducts rather than from the liver-cells, or aberrant epithelial rests.

Carcinomatous Lymphangitis of the Lung.—Troisier and Letulle³ contribute an article on the microscopic characteristics found in the lung in cases of carcinoma. It is pointed out that the richness of the lymphatic network in the lung enables us to recognize with great ease the different stages in the involvement of the tissues by carcinoma. Cancerous lymphangitis is closely related to the whole question of the generalization of the process by the lymphatics, hence the value of careful study of that process in the lung. The alveoli of the cancer are in direct communication with the lymphatics of the structure involved, and thus their penetration by the neoplastic elements is merely a question of time. Most frequently the cancer-cells carried are ar-

¹ Am. Jour. Med. Sci., CXXI, 287, 1901. ² Virchow's Arch., CLXII, 1, 1900.

³ Arch. de Méd. Exper., Mar., 1901; Brit. Med. Jour., May 18, 1901.

rested in the first lymphatic gland, but in other cases these cells are enabled to insinuate themselves into the lymphatics and become engrafted on their walls and proliferate into their cavities. There are two varieties of cancerous lymphangitis. In one, all the neoplastic elements that fill up the lymphatic spaces are large cells showing one or more nuclei. They accumulate and compress each other, and it becomes impossible to distinguish endothelial cells and the internal coating of the vessel. This form of lymphangitis is most usual in the lymphatics of small caliber. The second variety is characterized by caseous degeneration in the middle of the neoplastic area. The lymphatics are very evident on the surface of the lung, and have the appearance of nodular or moniliform lesions of a yellowish-white color. They are most evident in the neighborhood of the secondary cancerous nodules scattered over or in the pulmonary substance. The wall of the lymphatic does not seem to be much affected, the chief lesion to be made out being the disappearance of the endothelial cells that line the normal vessel. These cells, however, do not seem to play any part in the formation of cancer-cells, the latter being due solely to proliferation of the primitive cancer-cells carried into the lymphatic vessel. The thoracic duct may be involved in the same process. Lesions similar to those in the lung are found, and the duct becomes transformed into a hard gray or yellow moniliform cord. Transverse sections show that complete obstruction results from the presence of a mass adherent to the wall, grayish at the periphery and caseous in the center. This mass is made up of typical cancer-cells. The wall of the duct, when invaded by the carcinoma, shows some thickening—a feature not observed in the lymphatics of the lung.

Cholesteatomas of the Brain.—Thomas¹ reports 3 cases of cholesteatoma of the brain and reviews the literature upon the subject. He describes the cholesteatomas or pearl tumors as epithelial growths, with a more or less complete connective-tissue capsule, with a basal layer of cubical epithelial cells, showing the characteristics of the cells of the deeper layers of the epidermis, middle cells which are flattened, and central cells without nuclei and more or less completely cornified, arranged in lamellas between which crystals of cholesterin and fatty drops are found. The tumors make their way chiefly by displacement of brain tissue, but in some cases with destruction of nervous elements and more or less inflammatory reaction, as shown by increase of the neuroglia, by connective-tissue growth, and by areas of infiltration. The tumors are without blood-vessels, and are nourished from the surrounding tissues; usually the pia and the choroid plexuses. In regard to source, the embryologic theory seems on the whole to be the most satisfactory, whilst the almost invariable seat at the base of the brain or in the ventricles seems to give support to the suggestion of Beneke,² that their source in most cases is from the epithelial cells of the upper part of the alimentary canal, although this explanation is not quite satisfactory for

¹ Jour. of Med. Research, new series, I, 220, 1901.

² Virchow's Arch., CXLIX, 95, 1897.

the cholesteatomas containing hairs, or for the dermoid growths. These tumors are of very slow growth and often produce no symptoms, being found accidentally at the necropsy. The symptoms are somewhat variable, as one would expect from the variable situation of the tumors and their seat at the base of the brain. These symptoms often are those of involvement of one or more of the cranial nerves, or of the peduncles of the cerebellum. Most often, however, they are merely irritative, as shown by the frequent occurrence of convulsions.

Malignant Myoma of the Uterus.—Mastny,¹ after a discussion of the literature, reports a muscular tumor of the uterus that assumed large dimensions and gave rise to many metastases in different organs. It belongs to those rare cases of myomas of the uterus in which the muscle tissue has lost its typical structure and, through the activity of some unknown influence, has become transformed into sarcomatous tissue—that is, round and spindle-shaped cells, between which there is but a fine connective-tissue reticulum. It is proper to designate such tumors myoma sarcomatodes (Williams), or, better, myoma malignum.

MISCELLANEOUS.

Acute Amyloid Disease and the Relation of Amyloid Disease to Hyaline Degeneration.—Green² was able to produce hyaline degeneration in the organs of rabbits and mice by the subcutaneous, intravenous, and intraperitoneal injection of living cultures of *Staphylococcus pyogenes aureus*, and to produce amyloid disease and hyaline degeneration in varying degrees in the organs of hens by injecting living broth cultures of *Staphylococcus pyogenes aureus* into the substance of the pectoral muscles, and by injecting a sterile neutral solution of peptone into the pectoral muscle of one hen. He found evidence that an acute form of amyloid disease exists and that there are many points of resemblance between amyloid disease and hyaline disease in man. Hyaline degeneration always precedes amyloid disease; it is, indeed, an early stage of the latter. By soaking fresh fragments of organs of healthy animals in hemolyzed blood, early hyaline changes in connective tissue and mucoid changes in epithelium were produced, but no amyloid material. Examining the blood of hens, previously healthy, that had been injected with broth cultures of *Staphylococcus pyogenes aureus*, it was found that there was a marked increase of one particular kind of eosinophile cell (with large oblong granules) 20 hours after the injection, and a decrease when the injections were discontinued for 24 hours; after death the organs revealed amyloid changes. Examination of the blood of a hen before and after injection of a neutral sterile solution of peptones showed marked increase of the same type of eosinophile cell 20 hours after each injection and a decrease when the injections were discontinued for 24 hours; after death the organs of the hen revealed amyloid disease. Examination of the blood of a cock showed increase of the eosinophile cells after an

¹ Zeit. f. Heilk., XXII, 117, 1901.

² Jour. of Path. and Bact., VII, 184, 1901.

injection of staphylococcus, but after several injections of staphylococcus together with an antistaphylococcic serum no increase of the eosinophiles occurred on any occasion, and no amyloid disease of the organs was found after death. The author thinks that eosinophile cells are directly concerned in the production of amyloid disease, and that amyloid disease probably is associated with the deposition in the tissues of the substance forming granules of one particular form of eosinophile cell, which substance subsequently to deposition undergoes some alteration; and that amyloid disease may, after all, be an infiltration and not a degeneration, though the tissues probably suffer some pathologic change before the depositing of the material.

Amyloid Degeneration.—The subject of amyloid degeneration and the relation of amyloid to amylaceous bodies and to hyaline material are also ably discussed by Oplüls.¹

The Young Plasma Cell or Lymphocyte in Chronic Inflammation.—Herbert,² in a study of the pathology of trachoma and disturbances of other mucous surfaces, observed transitions from ordinary connective tissue to normal adenoid tissue, and from this onward to granulation or chronic inflammatory tissue. Studied in the conjunctiva, the change consists in the cellular elements becoming much more numerous, many of them being transformed from fixed connective-tissue cells into plasma cells and small round cells or lymphocytes, a large proportion of the latter being massed in follicles and nodules. These cells undergo rapid multiplication. Attention is directed also to amoeboid activity of lymphocytes, which can be especially well studied in sections of large palpebral papillas that represent an occasional later development of trachoma follicles. Although it is generally taught that the small round-cell infiltration of inflammation, the "cells of repair," otherwise lymphocytes or daughter plasma-cells, come from the blood-vessels, some of the writer's specimens demonstrate exactly the opposite movement in these young cells—namely, their entrance into the blood stream directly from the tissues through the walls of small veins.

The Formation of Oxalic Acid in the Human Body.—Stradomsky³ believes that oxalic acid is a normal and constant constituent of human urine, and that an adult, on ordinary mixed diet that does not contain any food-stuff rich in preformed oxalic acid, excretes daily with the urine on an average 0.015 gram of oxalic acid. The greatest excretion of oxalic acid occurs when the subject is on an ordinary mixed diet; less when he is on a diet consisting largely of meat; still less when he is on a diet consisting largely of fats; and least when he is on a diet composed largely of carbohydrates. The relatively large amount excreted on a meat diet is dependent upon colloid materials and possibly also kreatin, but not upon albuminous bodies and nucleoalbumin. The administration of food-stuffs containing preformed oxalic acid results in marked increase in the oxalic acid excreted in the urine (ali-

¹ Jour. of Exper. Med., 1900, V, 111.

² Jour. of Path. and Bact., VII, 90, 1901.

³ Virchow's Arch., CLXIII, 404, 1901.

mentary oxaluria). Oxalic acid is produced also in the human body itself, its source being the colloid materials and possibly kreatin. Oxalic acid excreted in the urine of man, therefore, has a twofold source: The human body, in which it is produced by chemic processes; and the food, in which it not only exists preformed, but from which it may be formed by chemic processes. Following the administration of oxalic acid by the mouth, only 25.3% could be recovered from the feces and the urine. As in consequence of the fermentation and decomposition processes that take place in the intestinal tract a portion of the oxalic acid is destroyed, it cannot be asserted with certainty that the unrecoverable 63.7% has been subject to decomposition within the organism. It is probable, however, that but a small portion is destroyed within the intestine.

Spontaneous Gangrene in Young Subjects.—Wulff¹ gives the histories of several cases of spontaneous and progressive gangrene occurring in subjects without syphilitic taint and without evidences of disease of the heart, kidneys, or other internal organs. Reference is made to the views of different writers on the subject—Winiwarter, Zoëge von Manteuffel, Sternberg, etc. In the cases reported there was no evidence of disease of the nerves, but the arteries appeared unduly small in caliber, and were the seat of obstruction central to the gangrene. As within the area of obstruction pigment was found, it is presumed that the obstruction was due to thrombosis rather than to endarteritis obliterans, of which there was but slight evidence. In the patulous vessels the muscular coat was thickened and contracted—a circumstance that induces Wulff to believe that the thrombosis is the result of contraction of the muscular coats of the vessels brought about by nervous influence. Thinning and retrograde metamorphoses of the muscular coats occur after the thrombosis has taken place. The actual cause of the nervous disturbance remains doubtful, but it is possible that tobacco in some way may be answerable.

Death Due to Hypertrophy of the Thymus.—Taillens,² from a study of the question, concludes that hypertrophy of the thymus may be the cause of death. The mechanism whereby this results, however, varies in the convulsive form, in which death occurs suddenly in consequence of action on the heart, and in the compression form, in which death occurs slowly from asphyxiation. In the convulsive form treatment is useless, since the symptoms develop so rapidly that there is no time to act. In the compression form medicinal treatment is useless, and even intubation and tracheotomy may prove futile. The only case definitely diagnosed and cured by operative procedures (Siegel's) suggests a rational plan of treatment—opening of the anterior mediastinum and suturing the gland to the substernal fascia. The pathologic importance of hypertrophy of the thymus may be considerable, especially in some medicolegal cases in which death has been wrongly attributed to negligence or criminal intent. It is possible that in some rare cases of

¹ Deut. Zeit. f. Chir., LVIII, 478, 1901.

² Rev. Méd. de la Suisse Romande, No. 345, 1901.

death attributed to goiter, as also in some cases in which it is found impossible to dispense with the tube after tracheotomy, the thymus may be at fault. The designation thymic asthma seems to be ill chosen. The preferable term for the rapid convulsive form of the affection is cardiac death or sudden death due to the thymus, while for the slower asphyxial form the better term is thymic tracheostenosis. These terms serve to indicate the differences between the two forms of the affection, and they tend to prevent the classification under the name thymic asthma of disorders having nothing whatever to do with the thymus gland.

Mechanical Disturbances in the Growth of Bone.—Maass¹ details the results of his experiments undertaken with a view to ascertain the influence of pressure and tension on the growth of bone. Having selected rabbits, he encased their limbs in different abnormal positions in plaster casts, and at the end of from 4 to 6 weeks killed the animals and examined the bones. Alterations in form and structure were found, but only such as were referable to the direct action of the pressure and tension. The bones continued to grow in the direction of least resistance and showed no evidence of either hypertrophy or atrophy. Applying the results of his experimental investigations to the study of the alterations found in rachitic human skeletons, he concludes that the changes found in these are due also to mechanical influences and not to inflammatory or irritative processes. These influences, assisted by deficiency of bone salts in the case of rachitis, interfere with the normal development of the bone and thus occasion the deformities.

The Pathology of Herpes Zoster.—Head and Campbell² find that the primary lesion is in the ganglion of the posterior root, and is an acute inflammation frequently accompanied by hemorrhages. In the nerve-roots the first change is one of acute degeneration; this is followed by a greater or less amount of secondary sclerosis. Similar changes take place distally in the peripheral nerves. In the spinal cord acute degeneration of the root fibers in the posterior columns follows the ganglionic lesion, but leaves no perceptible sclerosis, probably owing to the relatively small number of fibers destroyed. The herpetic vesicles consist of a cavity the floor of which is formed by a naked papilla in a condition of profound inflammation. The contents of the vesicles were found sterile in all cases. Lymphatic glands connected with the area of eruption frequently enlarge. The writers look upon herpes zoster as an acute specific disease; they point out the infrequency of second attacks, and compare the disease with acute poliomyelitis. The lesions are similar, and the posterior root ganglion is the exact equivalent of the anterior horn.

TECHNIC.

A New Method for Embedding in Celloidin.—Stepanow³ recommends the following method for embedding in celloidin as time-saving,

¹ Virchow's Arch., CLXIII, 185, 1901.

² Brain, Autumn, 1900; Brit. Med. Jour., Apr. 20, 1901.

³ Zeit. f. wissenschaftliche Mikrosk., XVII, 185, 1900.

as causing better impregnation of the tissue than usually occurs, and as permitting the cutting of thinner sections (3 to 5 μ): (1) Dehydrate the tissue in 95 % or absolute alcohol in the usual manner; (2) place in oil of cloves for several hours; (3) place in the following so-called "normal" solution for 3 to 6 hours or longer—celloidin well dried 1.5 grams, oil of cloves 5 cc., ether 20 cc., and absolute alcohol 1 cc.; (4) open the vessel containing the tissue and allow the solution gradually to evaporate for from 4 to 6 hours; (5) pour the thickened celloidin with the tissue into a filter paper and allow the solution to thicken and become firm, preferably in a warm place (as it thickens it clears); (6) when the solution has become firm, cut out the section and mount it in the usual manner; (7) harden in 70 % to 85 % alcohol in the usual manner. The hardening process may be hastened by adding to the alcohol 20 % to 30 % of chloroform, or by placing the section first in chloroform for 2 to 3 hours, or in chloroform vapor for 2 hours, and finally in alcohol for 2 to 4 hours or as long as may be desired. Sections may be cut in alcohol in the usual manner, or by using anethol (highly recommended by Stepanow¹) exceedingly thin frozen sections may be cut, or without placing the block in alcohol sections may be cut dry. The use of cedar oil in mixtures of celloidin is also recommended by Jordan.²

A Connective Tissue Stain.—F. B. Mallory³ considers his differential stain for connective-tissue fibrillas and reticulum the best ever proposed for that purpose. The fibrillas and connective-tissue reticulum, amyloid, mucus, and certain other hyaline substances stain blue; nuclei, protoplasm, elastic fibers, axis-cylinders, neuroglia fibers, and fibrin, red; red blood-corpuscles and myelin sheaths, yellow. The fibrillas and reticulum of connective tissue, the fibrin, and the smooth and striated muscle are the most distinct. The stains used are: acid fuchsin, phosphomolybdic acid, and a solution of anilin blue, orange G, oxalic acid, and water. Fixing must be done in HgCl_2 or Zenker's fluid. The method with slight modifications may also be used for nerve tissue. He also describes an iron-chlorid and hematoxylin stain for nuclei and fibers. Any of the fixing agents may be used excepting formaldehyd. The nuclei are stained a dark blue; fibrin, grayish to dark blue. Ferric chlorid is used before and after the hematoxylin. In using phosphotungstic-acid hematoxylin for neuroglia fibers the nuclei, neuroglia fibers, and fibrin stain blue; axis-cylinders and ganglion cells, pale pink; connective tissue, deep pink.

Staining Nucleoli.—Reddingius⁴ describes the following method for staining nucleoli distinctly: Harden the tissue in alcohol, embed in celloidin, and cut sections. (1) Place sections in Löffler's methylene-blue solution for several seconds to 3 minutes; (2) wash in a plentiful supply of tap water; (3) place in a saturated alcoholic (96 %) solution of picric acid, and allow to remain until the sections are dehydrated; (4) lay in origanum oil until the sections are clear; (5) place on a slide,

¹ Zeit. f. wissenschaftliche Mikrosk., XVII, 181, 1900.

² Zeit. f. wissenschaftliche Mikrosk., XVII, 191, 1900.

³ Jour. of Exper. Med., Oct. 1, 1900. ⁴ Virchow's Arch., CLXII, 206, 1900.

remove the oil with bibulous paper, and mount in balsam. Differentiation takes place in the oil of origanum.

Eosin and Methylene-blue Blood Stain.—Von Willebrand,¹ having observed that when to a mixture of eosin and methylene-blue an alkali is added, the blue color predominates, and that when to the same mixture an acid is added, the red color predominates, was led to experiment, and finally devised the following stain: To a mixture consisting of equal parts of a 0.5 % solution of eosin in 70 % alcohol and a concentrated watery solution of methylene-blue (generally presenting a diffuse blue color) a 1 % solution of acetic acid should be added drop by drop (10 to 15 drops to 50 cc. of the mixture) until the red color of the eosin is sufficiently manifest. Blood preparations fixed by heat, absolute alcohol, or formalin and alcohol, should be stained with this solution for from 10 to 15 minutes (warming until steam arises), and then washed in water. The erythrocytes are red, the nuclei sharply defined and of a dark blue color, the neutrophile granules violet, the acidophile granules red, and the mast-cell granules intensely dark blue.

Staining Erythrocytes in Sections.—To bring out conspicuously the erythrocytes in sections, the following method is recommended by Petroff²: Tissues hardened in Müller's fluid, formalin, or Orth's fluid, should be embedded in paraffin, and very thin sections cut; then follows: (1) Removal of the paraffin with xylol, alcohol, and water; (2) nuclear stain with Bismarck brown (concentrated solution in 1 % acetic acid) for 10 to 15 minutes, or with lithium-carmin or alumarmin, for 20 to 30 minutes (in which case differentiation in acid alcohol should follow); (3) washing in water; (4) staining for from 10 to 15 minutes in a 20 % watery solution (an alcoholic solution diluted with 5 times its volume of water) of malachite green, or brilliant green, or Victoria green; (5) washing in water; (6) staining for a minute and a half in Van Gieson's stain or in a concentrated watery solution of picric acid that has been diluted with 4 or 5 times its volume of water; (7) rapid dehydration and decolorization in absolute alcohol; (8) xylol, turpentine, or oil of bergamot, and balsam. The erythrocytes are distinguished by their bright green color, the other tissues being yellowish-brown (Bismarck brown) or yellowish-red (carmin).

Staining and Differential Estimation of the Leukocytes in the Blood-counting Chamber.—Having pointed out certain possible inaccuracies in the differential estimation of the leukocytes in film preparations, Zollikofer³ suggests that the leukocytes be stained and that both the absolute and the differential count be made in the blood-counting chamber. For staining, 2 solutions are recommended: (1) Eosin, W. G., 0.05, concentrated formalin solution 1.0, and distilled water 100; (2) methylene-blue, B. X., 0.05, concentrated formalin solution 1.0, and distilled water 100. Each solution must be filtered

¹ Deut. med. Woch., xxvii, 57, 1901.

² Bolnit. Gaz. Botkina, 1899; Zeit. f. wissenschaftliche Mikrosk., xvii, 359, 1900.

³ Zeit. f. wissenschaftliche Mikrosk., xvii, 313, 1900.

and kept in the dark. Just as one is ready to withdraw the blood from the patient, equal parts of both fluids are to be mixed and used as the diluting fluid. Using the Thoma-Zeiss pipet, the blood should be diluted 1 to 20, mixed in the pipet for 5 minutes, and then a small drop placed in the counting-chamber (preferably the counting-chamber of Elzholtz). Using the highest dry lens that one may, it will be observed that the blood-plates are arranged in typical groups and that they have a grayish-blue tint, and that the different varieties of leukocytes are readily distinguished—the nuclei and the granules. Both the absolute and differential estimation of the leukocytes is thus readily effected.

Staining Nerve-cells and Nerve-fibers.—For staining nerve-cells kresylviolet is warmly recommended by Bielschowsky and Plén.¹ Celloidin, paraffin, or frozen sections should be placed in a weak solution of kresylviolet RR (6 to 10 drops of a concentrated watery solution to 50 cc. of water) at room temperature for 24 hours. Then they should be washed in water, differentiated and dehydrated in alcohols of increasing strengths, cleared in oil of cajeput and in xylol, and mounted in balsam. Mosse² recommends the following procedures for impregnating the medullary sheaths of nerve-fibers with silver: Place celloidin sections for 10 minutes in a 2% watery solution of argentamin; wash off the excess of stain in water; place the sections for several minutes in a 10% solution of pyrogallie acid; and differentiate according to the well-known Weigert-Pal method. To impregnate the nerve-cells the tissue should be hardened according to the Carnoy-Gehuechten method, embedded in paraffin, and very thin sections cut. These should be placed in the argentamin solution for 2 or 3 minutes, and reduction effected in the pyrogallie acid solution, as already noted. By this method Nissl's bodies, the nuclei, and the nucleoli are said to be impregnated beautifully with the silver salt.

Differential Stain for Fat.—Lewinson³ recommends the following as a trustworthy method for staining fat: (1) Fix the tissue in Müller's fluid for from 2 to 6 weeks, dehydrate in alcohol (70%, 80%, etc.), and embed in celloidin; (2) transfer the sections (10 to 15 μ in thickness) directly from alcohol into the stain, consisting of 2 grams of hematoxylin dissolved in a small amount of alcohol and then added to 100 cc. of a 2% solution of acetic acid; here they remain at a temperature of 40° C. for 12 hours; (3) wash in water; (4) place in a watery solution of potassium permanganate; (5) wash in water; (6) differentiate in a 2% solution of oxalic acid, or in a mixture of 2 parts of a 2% solution of oxalic acid and 1 part of a 2% solution of potassium sulphate (5 minutes); (7) wash in water, dehydrate in alcohol, and mount. If fat is present, the section has a grayish or grayish-violet color, depending upon the amount of fat.

¹ Neurol. Centralbl., XIX, 1141, 1900.

² Deut. med. Woch., XXVI, No. 23, 1900.

³ Zeit. f. wissenschaftliche Mikrosk., XVII, 321, 1900.

THE BLOOD AND BLOOD-MAKING ORGANS.

Comparative Morphology of the Leukocytes.—Grünberg¹ details the results of his examination of the blood of a large number of animals (fish, amphibia, snakes, chickens, sparrows), undertaken with a view to ascertain the occurrence, distribution, and morphologic characteristics of the so-called specific granulations of the leukocytes of different classes of vertebrates. Leukocytes with a large nucleus and a narrow rim of protoplasm (corresponding to the human lymphocytes) were present in the blood of all animals examined. They are therefore present in all classes of vertebrates. Transitional forms, polymorphonuclear leukocytes, and true polynuclear leukocytes (relatively few) were present in the blood of all the animals examined with the exception of one of the snakes. With regard to the form of the cells, two types may be distinguished, the round (spherical) and the spindle-shaped. The latter is rare, having been identified positively in the blood of but one of the fishes. With regard to the granules, of the two varieties of basophilic granules, the δ -granules were not found in any of the bloods examined; the γ - or mast-cell granules, however, were present in all of the animals with the exception of one of the fishes. Neutrophile granules were found in only two of the snakes. The acidophile granules varied considerably in form, and crystalloid and noncrystalloid forms are distinguished; they varied also in their tinctorial affinities. An interesting and unique (hitherto undescribed) observation was the discovery of acidophile granules in the lymphocytes of one of the fishes.

The Pathology of Pernicious Anemia.—Bain² refers to the theories advanced by Hunter, Stockman, and Mott to account for the production of pernicious anemia, reports several cases of the disease, and details the results of his analyses of the urine of patients suffering from pernicious anemia and from chlorosis. Taking into consideration the enormous diminution in the number of the red cells, with, as a rule, a striking rise in the color-index, increased deposit of iron in the outer zones of the liver lobules, and the absence of hemoglobinuria, it is, the author thinks, an inevitable inference that pernicious anemia is due to increased blood destruction taking place in the portal area. The fact that the subjugated sulphates are increased in pernicious anemia and that the administration of chloralbacid has no effect upon the amount of sulphates eliminated indicates that the usual cause of the increase is not at work in this disease. The putrefactive proteid destruction is therefore occurring in some other area, probably in the intestinal mucosa itself or in some of its glandular offshoots. The absence of any effect from the use of chloralbacid is further evidence of the divergence existing between this and other forms of anemia. Whether the hemolysis is due to a toxin produced by a special microorganism, or to an excess of some substance having a physiologic origin, or to a new and therefore essentially pathologic metabolic product, has not yet been determined.

¹ Virchow's Arch., CLXIII, 303, 1901.

² Lancet, Sept. 14, 1901.

A case of myelogenous leukemia complicated by miliary tuberculosis is reported by Jünger.¹ The leukemia is believed to have resulted from an abscess of the tongue. With regard to the relation of the leukemia to the tuberculosis, it is presumed that prior to the development of the leukemia the patient harbored a latent tuberculosis; that after the leukemia had existed for 3 months an awakening of the tuberculous process occurred—indicated by the occurrence of an abscess beneath the left ear; and that from this time on general infection of the lymphatics occurred—the glands, the seat of the leukemic process, being less resistant to the tubercle bacillus than normal glands.

The Normal Histology and Pathology of the Hemolymph Glands.—After reviewing the literature on the subject, Aldred S. Warthin² gives an account of his personal researches into the normal and pathologic conditions of the hemolymph glands. Lymph-glands with blood sinuses are constantly present in the human body. Two types may be recognized, to which the names splenolymph and marrow-lymph glands are applied. Between these, transition forms exist, as well as between these glands and the spleen, on the one hand, and the ordinary glands, on the other. Under normal conditions the hemolymph glands are most probably concerned chiefly in hemolysis and leukocyte formation, and play but little part, if any, in the formation of the red blood-cells. In diseases in which the blood shows marked changes, specific conditions are found in these glands of such a nature as to place beyond doubt their blood-forming function. Further, the study of the retroperitoneal tissues makes it very probable that the lymphadenoid structures present there are not stationary, but are constantly undergoing progressive and retrogressive changes, possibly of a cyclic nature. The intimate relationship existing between adipose tissue and lymphadenoid tissue is here strikingly shown; and the probable metaplasia of the former into the latter, as in the case of splenic anemia, confirms in a very important way the observations of Bayer, Tizzoni, and others. The close relations between spleen, lymph-gland, and bone-marrow is shown by the power of the hemolymph glands to take on the structure of either spleen or marrow, and to compensate for these organs when their function is abridged by disease. Many interesting problems are encountered in the study of these glands: the fate of the blood pigment; the formation of fuchsinophile bodies; the development of marrow-like giant cells from the reticulum both of the blood sinuses and lymphoid tissue, and probably also from the endothelial cells lining the sinuses; the relation of these and mononuclear eosinophiles to the formation of red blood-cells; the possible rapid formation and passage of leukocytes into the circulation in leukocytosis; and, finally, the development of nucleated red cells themselves. In regard to the latter point transition forms apparently exist between small lymphocytes and erythrocytes, and also between hyaline mononuclear leukocytes and nucleated red cells, so that the views of Löwit

¹ Virchow's Arch., CLXII, 283, 1900.

² Jour. of Med. Research, new series, I, 3, 1901.

and Howell appear to be confirmed. The study of these glands opens up many new and important lines of investigation with regard to the solution of the problems relating to blood formation and pathologic conditions of the blood and blood-forming organs, as seen in the various forms of anemia, leukemia, etc.

Lymphadenoma.—Clarke,¹ after a thorough review of the literature, decides that lymphadenoma is an infective disease, occurring in both an acute and a chronic form, but the organism or organisms that are the cause of the disease are still to be discovered. The fact that the tubercle bacillus may produce a disease almost simulating lymphadenoma is said to be a confirmation of this view. Although a certain, probably large, number of cases described under lymphadenoma, or Hodgkin's disease, are in reality tuberculous, there is no warrant for the view maintained by some writers that the disease is merely a general lymphatic tuberculosis. The differences between lymphadenoma and lymphosarcoma are pointed out, and it is said that it would conduce to clearness to confine the term lymphosarcoma to tumors limited to one or more groups of lymph-glands in continuity, varying in rate of growth, perforating the gland capsule, infiltrating or invading the surrounding tissues, sometimes causing metastases in distant organs, but without general involvement of the lymphatic tissues, and composed of small, round cells, with a fine reticulum. Lymphadenoma and lymphatic leukemia should be regarded as distinct diseases, and those cases in which, though the glandular enlargements resemble lymphadenoma, there are a greatly enlarged spleen and a leukemic condition of the blood should be classed as cases of lymphatic leukemia. The resemblance of lymphadenoma to lymphatic leukemia has led to the view that there may be a splenic and a myelogenic form of lymphadenoma, nonleukemic counterparts of leukemia; but there seems to be no positive evidence for this view, which in the former case would bring us very close to the condition known as splenic anemia. [That lymphatic leukemia and probably all forms of leukemia are manifestations of some form of infection scarcely admits of any doubt, although the infective agent has not yet been discovered. That lymphadenoma also is infectious is probably true, and since it has been demonstrated that many cases, clinically Hodgkin's disease, are really tuberculous, the necessity for revising our conceptions of the pathology of the lymph-glands has become imperative.]

Scrofulous Lymphadenitis.—Moore² is of the opinion that scrofulous lymphadenitis is due to tubercle bacilli of feeble virulence.

The Cause of the Acute Splenic Tumor in Intoxications and Acute Infectious Diseases, and the Physiologic Function of the Spleen.—Jawein³ gives a review of the literature and the results of his experimental investigations concerning the causation of acute splenic tumor. By the experimental administration of $KClO_3$ and $NaClO_3$ to lower animals, he was enabled to cause marked destruction of the erythrocytes and a concurrent hyperemia and hyperplasia of the spleen.

¹ Brit. Med. Jour., II, 701, 1901.

² Jour. of Path. and Bact., 1900, VI, 94.

³ Virchow's Arch., CLXI, 461, 1900.

The changes in the spleen are believed to be the consequence of increased functional activity consisting in the active removal from the circulating blood of degenerated red corpuscles. Following the administering of toluylendiamin there occurred a lessening of the erythrocytes in the circulating stream, and concurrently an acute and considerable increase in the size of the spleen—the destroyed red cells being taken up by the cells of the splenic pulp. The author believes that the cells destroyed in the circulating blood act as a specific irritant to the splenic cells and occasion an active hyperemia and hyperplasia of the spleen, and hyperplasia of the pulp cells. The acute splenic tumor of infectious diseases is also believed to be caused by the efforts of the spleen to remove destroyed erythrocytes that act as specific irritants to the cells of the splenic pulp. From these pathologic observations it may be inferred that the normal function of the spleen is to serve as an active filter for the blood so as to remove erythrocytes that have died in consequence of normal physiologic processes.

Milky (Chylous) Effusions in the Serous Cavities.—Shaw¹ reports a case of chylous ascites and chylous hydrothorax, and reviews the literature of chylous or milky effusions in the serous cavities. Of 115 cases of milky fluid in the abdomen 71 are described as chylous, 33 as chyloform, and in 11 the nature of the fluid was doubtful. Of milky fluid in the chest there were 54 cases, of which 31 were chylous, 13 chyloform, and 10 were of doubtful character. There were 2 cases of chylopericardium, 1 chylous and 1 chyloform.

The Histology of the Epithelium of Serous Membranes.—While studying inflammation of serous membranes, von Brunn² discovered that the endothelium of the pleura was distinctly ciliated, or, at any rate, provided with hair-like processes. [If this is the case, there can be no doubt of the epithelial nature of the endothelium covering the serous membranes. Many have long believed that, for all practical purposes, the endothelium of serous membranes may be considered epithelial. For instance, defects of the surface are quickly covered with a sheet of cells from the edges—a feature that occurs only with epithelium. Moreover, tumors of serous membranes generally have all the appearances of carcinomatous growths.]

THE CIRCULATORY SYSTEM.

Three cases of pneumococcus endocarditis, with a review of the literature, are reported by Henke,³ who believes that the pneumococcus is to be added to the group of pus-producing and pyemia-producing microorganisms; that there is a pneumococcus septicemia produced by the pneumococcus without the intervention of any other microorganism; and that biologically the pneumococcus is evidently one of the important forms of pus-producers and closely related to the streptococcus.

¹ Jour. of Path. and Bact., VI, 339, 1900.

² Centralbl. f. allg. Path. u. path. Anat., 1900, XI, 604.

³ Virchow's Arch., CLXIII, 141, 1901.

A case of extensive atheroma of the heart-valves, occurring in a girl aged 15 years, is reported by Brion.¹ There was stenosis of the mitral orifice, insufficiency of the aortic valves, and in the posterior mitral leaflet a pouch-like cavity containing an emulsion of fat, fatty round cells, compound granule cells, and platelets of calcium. [That slight and moderate grades of atheroma are quite common in young subjects must be apparent to all who have much experience in necropsy work.]

A case of true cartilage and true bone formation in the valves of the heart is reported by Rosenstein.²

The So-called "White Spots" on the Anterior Leaflet of the Mitral Valve.—After some reference to the literature, Beitzke³ describes his observations of the so-called "white spots" on the anterior leaflet of the mitral valve which he found in 51 of 73 hearts. They are found in subjects of all ages, even as young as 6 months, but not in the embryo nor in the newborn. They occur in otherwise normal valves, in diffusely thickened valves, as well as in valves the seat of verrucose endocarditis. They are found always on the ventricular surface of the leaflet and especially (in 75.6%) toward the junction of the septum and the ventricle. Less frequently they are situated at the point of attachment of the chordæ tendineæ; in other cases toward the root of the leaflet. They are usually grayish or yellowish-white, somewhat elevated; sometimes sharply circumscribed, again indistinctly limited. They may be round, ovoid, irregular, or striated; they vary in size between that of a pin's head and that of a one-cent piece; and sometimes they are hard and calcified. They appear to occur only on the anterior leaflet of the mitral valve. Microscopically they reveal lime and fat, degeneration of the connective-tissue cells and intercellular substance (without alteration of the elastic fibers), and almost always proliferation of the cells in the vicinity with subsequent fatty metamorphosis. The primary process is not the cellular proliferation, but rather the degeneration. The cause of the condition is believed to be mechanical injuries consequent upon the position of the leaflet, the impact of the blood against the ventricular surface, and certain associated lesions of the heart. In but 22% of the cases examined was the heart normal or almost normal.

The Myocardium in Infection, Intoxication, and Poisoning.—Giacomelli⁴ has made a series of experiments on animals with various bacteria, and afterward examined the myocardium. More or less marked alterations were constantly seen, for the most part confined to the heart muscle-fiber itself, sometimes, but rarely, affecting the interstitial connective tissue or the vessels. The changes in the connective tissue were generally associated with the presence of microorganisms, and consisted in a more or less diffuse lymphoid infiltration. There was no causal relationship between the changes in the connective tissue and

¹ Virchow's Arch., CLXII, 545, 1900.

² Virchow's Arch., CLXII, 100, 1900.

³ Virchow's Arch., CLXIII, 343, 1901.

⁴ Il Policlinico, VIII, fasc. 3 and 4, 1900; Brit. Med. Jour., July 13, 1901.

vessels and those in the heart muscle; the two might exist independently. The changes in the heart muscle varied from simple atrophy to fatty degeneration and destruction. There were no definite anatomic lesions corresponding to definite specific poisons. The changes are due to the direct action of the bacterial toxin and poison on the muscle-fiber itself, and are in themselves sufficient to produce cardiac paralysis—for example, after chloroform narcosis.

Cardiac Hypertrophy and Atrophy.—In order to ascertain whether hypertrophy of the heart is brought about by a numeric increase in the muscle-fibers, an increase of the individual muscle-fibers, or by both, Gutch¹ undertook a long series of investigations and careful measurements, from the results of which he concludes that the increase in the size of the heart is due largely to hypertrophy of the individual muscle-fibers. As the increase in breadth of the fibers is not sufficient to account for the whole increase in the weight of the heart, it is at least possible that along with an increase in breadth there is an increase in length. It is said that these factors are sufficient to account for the whole increase in weight of the heart without supposing any numeric hyperplasia of the fibers to take place; while, on the other hand, no direct evidence of such hyperplasia, such as karyomitosis, has ever been brought forward. In brown atrophy there probably occurs diminution in the size of the fibers, and hence diminution in the weight of the heart.

Waxy Degeneration of the Heart Muscle in Diphtheria.—In 4 cases of diphtheria Ribbert found a pronounced waxy degeneration of the heart muscle; but Loewenthal² has carefully examined the myocardium in 65 cases of infectious disease,—among them, 34 of diphtheria,—and was unable to find a single case in which there was waxy degeneration. Changes in the nuclei and cell accumulations at various places were found, but apparently no characteristic change.

Primary Tuberculosis of the Pericardium.—Riesman³ reports a case of primary tuberculosis of the pericardium in a man of 32 years, the disease taking the form of an obliterative pericarditis, and macroscopically presenting none of the features of tuberculosis. Microscopically typical tubercles with giant cells were found. In the tuberculous areas the elastic tissue had disappeared. During life the patient had had a pleural effusion, which had been removed by tapping. A little of the fluid injected into a guinea-pig produced tuberculosis in the animal. At the autopsy the pleura was free from tuberculous lesions.

THE URINARY ORGANS.

Ascending Urinary Infection Due to *Proteus vulgaris* and *Bacillus pyocyaneus*.—Three cases of ascending infection of the urinary tract, brought about by *Proteus vulgaris* and *Bacillus pyocyaneus*, are reported by Blumer and Lartigau.⁴

¹ Jour. of Path. and Bact., VII, 309, 1901.

² Centrabl. f. allg. Path. u. path. Anat., 1900, XI, 612.

³ Am. Jour. Med. Sci., July, 1901.

⁴ N. Y. Med. Jour., Sept. 22, 1900.

Adhesive Glomerulitis (Glomerulonephritis).—After a critical discussion of the literature on alterations of the glomeruli in nephritis, Engel¹ reports the results of his investigations of several cases of nephritis with particular reference to the glomerular changes. He notes especially that the cellular infiltration within the capsule does not consist of granulation cells and leukocytes, but that it presents itself in a characteristic glandular arrangement and that it is derived from proliferation of the normal epithelium of the glomerulus and of the capsule. The source of the proliferated connective tissue is difficult to determine, but it appears not to result from proliferation of the connective tissue of the capsule, but to be rather a secondary process—the result of fibrous connective-tissue transformation of the fibrinous exudate of the early stages of the process. Whether the glomerulitis is a primary inflammation of the connective tissue of the blood-vessels, or of the epithelial constituents of the glomeruli, is yet to be determined. As, however, the manifest inflammatory alterations consist in fibrin formation, and as this fibrin may owe its origin to fibroid degeneration of the cells,—to diphtheric alterations of the epithelium,—the process may be referable to a primary disease of the epithelium. Though it is more likely that the fibrin is derived from the blood-plasma, such source also indicates primary disease of the epithelium, as does also the fact that within the fibrinous exudate detached and degenerated epithelial cells are to be found. The cause of the glomerulitis is to be found in the primary lesion of the epithelium; following this there occurs, in consequence of the fibrinous exudate, adhesion of the two opposed surfaces of the capsular space; and finally epithelial proliferation and connective-tissue organization of the fibrinous exudate take place. As neither the variety of inflammation of the kidney nor its severity and duration are of especial significance in causing the alterations in the glomerulus, adhesive glomerulitis should be looked upon as a more or less independent affection.

Punctiform Calcareous Bodies (So-called Calcified Glomeruli) in the Kidney Cortex.—Baum² details the results of his investigation of the deposit of calcium in the kidney. The calcium appears macroscopically as small whitish lines or dots, but writers disagree as to whether it is deposited in the glomeruli or in the capsular spaces. Having examined 20 kidneys, selected because of their macroscopic appearances, Baum found two kinds of cysts, without indications of chronic interstitial alterations. The larger cysts were irregularly shaped, their walls lined with cylindric epithelium, and they contained colloid material. They were found usually in the cortex, occasionally in the pyramids. The smaller cysts were round, about the size of a glomerulus, and present only in the cortex. Their epithelium was low, similar to that lining the capsular spaces; they contained no colloid, but occasionally what seemed to be a loop or two of a glomerulus. These were supposed to be congenital in origin—to represent capsular spaces in which glomeruli had not developed. The

¹ Virchow's Arch., CLXIII, 109, 1901.

² Virchow's Arch., CLXII, 85, 1900.

calcium, as small granules or concentrically arranged spherules, was found especially within the cysts that contained colloid material; but rarely was any calcium found in sclerosed or obliterated glomeruli.

Multiple Liomyomas of the Kidney.—Lartigau and Larkin¹ report 2 cases of multiple liomyomas of the left kidney occurring in women aged about 35 years. The growth consisted of small subcapsular nodules, averaging about 2 mm. in diameter, and consisting microscopically of bundles of rather loose unstriped muscle-fibers running in different directions, and sharply separated from the surrounding kidney tissue by narrow bands of fibrous tissue. Myomas of the kidney are rare; liomyomas may be multiple and discrete in distribution; they may have a twofold origin (the capsule of the kidney and the blood-vessels). Neoplasms of this nature may give rise to no symptoms during life.

Carcinoma of the Kidney Arising in the Glomeruli.—Abram² reports a case of carcinoma of the kidney arising in the glomeruli, and occurring in a boy aged 16 years. Throughout the cortex of the kidney the glomeruli were conspicuous on account of deeply staining epithelium lining the parietal layer of Bowman's capsule. This consisted of several layers of slender columnar cells with oval nuclei. The vascular tuft and its epithelial covering appeared normal. In a few places the proliferating epithelium completely filled the capsule. In some places the growth penetrated the basement membrane and infiltrated the surrounding tissue. Tumor nodules were found in different portions of the body, but the primary growth is believed to have been in the kidney. Reference is made to several somewhat similar cases reported in the literature.

Two Cases of Lipoma of the Kidney.—W. S. Lazarus-Barlow³ reports 2 cases of lipoma of the kidney found postmortem. They were situated in the cortex, a place normally devoid of fat. They were of spheroidal shape, the size of a Spanish nut, and possessed no sign of limiting membrane, but were sharply differentiated from the surroundings by their yellow color. Microscopically they were made up of ordinary fatty tissue. Lipomas are of no clinical importance. They may result from a localized metaplasia of renal substance or may be a fatty modification of a preexisting mass of ordinary connective tissue.

DIGESTIVE TRACT.

Sarcoma of the Esophagus.—Two cases, with a review of 7 other cases found in the literature, are reported by Starek.⁴ The cases reported were large round-cell sarcomas presumed to have taken their origin from the mucosa. They showed marked tendencies to degenerative alterations (ulceration, hemorrhage), and gave rise to metastases.

Primary sarcoma of the stomach is the subject of a report by

¹ Jour. of Med. Research, new series, I, 25, 1901.

² Jour. of Path. and Bact., VI, 384, 1900.

³ Brit. Med. Jour., Sept. 29, 1900.

⁴ Virchow's Arch., CLXII, 256, 1900.

Mintz,¹ who describes the clinical and pathologic features of a case and gives a review of the literature. The clinical diagnosis of the case reported had been carcinoma of the pylorus. The necropsy revealed in the region of the pylorus a hard tumor, the size of a fist, but spreading toward the fundus diffusely, and showing an ulcerated area about 2 cm. in diameter. Microscopic examination of the growth proved it to be a lymphosarcoma. Metastases were found in the glands of the lesser curvature and of the hepatoduodenal ligament and in the testicle. In the diagnosis of gastric tumors the possibility of sarcoma more frequently should be taken into consideration.

The Etiology of Dysentery.—Flexner² sums up our present knowledge of the cause of dysentery as follows: (1) No bacterial species yet described as the cause of dysentery has any special claim to be regarded as the chief microorganism concerned with the disease; (2) it is unlikely that any bacterial species that is constantly and normally present in the intestine or in the environs of man, except where the disease prevails in an endemic form, can be regarded as a probable cause of epidemic dysentery; (3) the relations of sporadic to epidemic dysentery are so remote that it is improbable that the two diseases are produced by the same organic cause; (4) the pathogenic action of *Amœba coli* in many cases of tropical and in certain examples of sporadic dysentery has not been disproved by the discovery of the amœba in the normal intestine, and in diseases other than dysentery. While amœbas are commonly present and are concerned in the production of the lesions of subacute and chronic dysentery, they have not thus far been shown to be equally connected with the acute dysenteries, even in the tropics. In the former varieties bacterial association probably has much influence on the pathogenic powers of the amœba. Reference is made to Shiga's discovery of a bacillus believed to be the cause of epidemic Japanese dysentery; to the study of dysentery in the Philippines by Flexner and his colleagues; to the detection by Flexner of a similar bacillus in a case of subacute or chronic dysentery contracted by an American soldier in Porto Rico; and to the detection of similar bacilli by different observers in different parts of this country and Europe. This bacillus exhibits pathogenic powers when inoculated into the lower animals, and is agglutinated by the serum of a patient suffering from dysentery. It is believed that the typical acute and infectious dysentery is probably bacillary in origin and that this bacillus is the cause of the disease. On the other hand, the chronic form of the disease appears to be dependent upon at least two sets of causes. The one represents a continuation of the acute disease and is probably due to the same microorganism, the other is due to a different organism, apparently *Amœba coli*. The first-mentioned variety of the disease only may be expected to give the serum reaction with *Bacillus dysentericæ*.

¹ Berlin. med. Woch., No. 32, 1900.

² Phila. Med. Jour., Sept. 1, 1900; Johns Hopkins Hosp. Bull., 231, 1900; Centralbl. f. Bakt., XXVIII, 625, 1900; Jour. Am. Med. Assoc., XXXVI, 6, 1901; Univ. of Penna. Med. Bull., XIV, 190, 1901.

Enterococcus as the Cause of Dysentery.—Lewkowicz¹ describes a microorganism which he calls enterococcus and which he believes is the cause of dysentery epidemics in Poland and possibly also the cause of tropical dysentery.

Necroses of the Liver.—Mallory² bases his observations in part on the routine histologic examination of the livers from 1190 consecutive necropsies and in part on the study of the lesions produced experimentally in the livers of guinea-pigs and rabbits. In the livers from the necropsies two types of necrosis were found: the one diffuse in that it affected every lobule in the liver (so-called central necrosis, the lesion occurring in the center of the lobule and spreading peripherally); the other focal, occurring irregularly both in the liver and in the individual lobule (the so-called focal necrosis). Central necrosis was found in 95 cases. It occurred in a wide variety of diseases, but chiefly in acute infective processes—diphtheria, acute endocarditis, lobar pneumonia, acute peritonitis, epidemic cerebrospinal meningitis, etc. Forty-five of the cases (47%) were complicated with cardiac lesions, such as chronic endocarditis, chronic myocarditis, or mural thrombosis. Bacteriologic examinations, though not complete, were instructive: In 12 cases no cultures were made; in 17 they were negative; in the remaining 66, *Streptococcus pyogenes* was present in one or more organs (often as a septicemia) 19 times, *Diplococcus lanceolatus* 4 times, *Staphylococcus pyogenes aureus* 5 times, *Bacillus diphtheriae* twice, *Diplococcus intracellularis meningitidis* twice, and *Bacillus mucosus capsulatus* once. Alone or combined with other pathogenic bacteria, *Streptococcus pyogenes* was present 40 times, *Diplococcus lanceolatus* 15 times, *Bacillus diphtheriae* 12 times, *Staphylococcus pyogenes aureus* 10 times. With the exception of a few of the cases, the central necrosis was not recognized macroscopically. It is believed that this type of necrosis is due to the action of strong toxins in the circulation, most often to the streptococcus toxin. The central origin of the necrosis may be due to the associated heart-disease, or to the fact that the center of the lobules is less well nourished than is the periphery. Proof of the toxic origin of this form of necrosis was furnished by the production of the earliest stages of central necrosis by injecting enough diphtheria toxin into two rabbits to kill them on the third and seventh days respectively. Central necrosis may be combined with focal necrosis. Focal necrosis was found in 51 livers (excluding cases of tuberculosis). Of these, 28 occurred in typhoid fever, the remaining 23 in acute peritonitis, diphtheria, lobar pneumonia, etc. In 14 cases *Streptococcus pyogenes* alone was present, almost always as a septicemia; in 1 case *Streptococcus pyogenes* was associated with *Diplococcus lanceolatus*; in 1 case *Diplococcus lanceolatus* occurred alone; and in 1 case *Staphylococcus pyogenes aureus* occurred alone. So far as could be made out, focal necrosis of the liver may occur in at least 3 different ways: (a) Around bacteria—that is, in direct relation with them; (b) by occlusion

¹ Przegląd lekarski, Nos. 5 and 7, 1901; Centralbl. f. Bakt., etc., XXIX, 635, 1901.

² Jour. of Med. Research, new series, I, 264, 1901.

of the capillaries by large phagocytic endothelial cells; and (c) by occlusion of capillaries by fibrin thrombi. The results of experimental investigations confirmed these opinions.

Focal Necrosis of the Liver.—Longridge¹ states that toxemia solves many knotty problems in pathology, and he points out certain lesions that are to be found in the liver in toxemia, especially foci of necrosis, formerly regarded as lymphoid nodules, and known to be common in typhoid fever and other infections, and in eclampsia. These are described in detail and reference is made to the antitoxic action of the liver. It is suggested that duodenal ulceration in extensive burns results from the action on the duodenum of bile charged with toxins, and that a spreading and coalescing of foci of necrosis in the liver, the result of toxemia, may produce the clinical and anatomic picture of acute yellow atrophy of the liver. Though it would, perhaps, be premature to state that eclampsia and acute yellow atrophy of the liver are one and the same disease,—the former being the early stage of an acute toxemia which, when advanced, develops into the latter,—yet it is believed that both diseases are fruits of the same tree.

Suppurative Pylephlebitis Associated with Anaerobic Bacteria.—A case of this is reported by Norris.²

The Etiology of Abscess of the Liver.—Kobler³ furnishes a number of statistics illustrating the etiologic relationship of different diseases to abscess of the liver. Thus, at 10,089 necropsies performed in Kiel, Luda found 29 cases of abscess of the liver. Of these, 55% were due to pyemia, and 31% to disease within the portal area. In Vienna, at 17,204 necropsies, 79 cases of abscess of the liver were encountered. The etiology of these was as follows: 31 (38%) were due to occlusion of the bile-ducts (23 to gall-stones, 7 to carcinoma of the bile-duct, the regional lymph-glands, or the duodenum, with consecutive dilation of the biliary passages, and 1 to the presence of *Ascaris lumbricoides* in the ductus choledochus); 17 (21.5%) were due to disease within the area of distribution of the portal vein (6 to inflammatory disease of the female genitalia, 4 to dysentery,—1 of which was of the tropical variety,—3 to perityphlitis, 3 to pylephlebitis, and 1 to a cicatrix of the ileum); 13 (16.5%) were due to infection carried by the hepatic artery (6 to simple pyemia, 2 to endocarditis, 1 each to injury to the head, acute prostatitis, gonorrhea, otitis media, and bronchiectasis); the remaining 18 cases were due to a variety of causes: 6 cases occurred idiopathically (?); 8 were due to suppuration of echinococcus cysts; 2 were associated with acute cholecystitis; 1 with carcinoma of the pylorus; and 1 with carcinoma of the cystic duct. In Bosnia 10 cases of liver abscess were found at 1307 necropsies. Eight of these were due to dysentery (6 chronic cases and 2 acute cases), and 2 to disease of biliary passages (1 to *Ascaris lumbricoides* and 1 to cholecystitis). Kobler points to these statistics as indicating the difference in the etiologic importance of dysentery in different countries.

¹ Brit. Med. Jour., II, 777, 1901.

² Jour. of Med. Research, new series, I, 97, 1901.

³ Virchow's Arch., CLXIII, 134, 1901.

The Experimental Production of Hepatic Lesions of Splenic Origin.—Chauffard and Castaigne¹ have made an interesting set of experiments demonstrating the possibility of passing various harmful and innocuous substances from the spleen to the liver, with subsequent localization in that organ, and the production, sometimes, of pathologic changes limited to the liver and the spleen. These observations are of interest in connection with the recent studies of Collet and Gallavardin upon primary splenic tuberculosis with secondary hepatic involvement. They appear to have proved from an experimental standpoint (1) that solid particles introduced into the parenchyma of the spleen may reach the liver and become localized there, and (2) that tuberculosis of the liver may follow a primary localized splenic tuberculosis. By a series of experiments they were able to demonstrate the fact that when injected into the splenic pulp, carmin reached the liver only after several days, while when the injection was made into the splenic artery, the substance could be found in the liver in 24 hours. Three interesting experiments were made with intrasplenic inoculation of tuberculosis in guinea-pigs. In the first series 6 animals were inoculated with a culture of human tuberculosis and all the animals were killed in about 2 months. In all instances the lesions were purely splenic. In a second series 6 guinea-pigs were inoculated with tuberculous products from the spleen of a subject dead of general tuberculosis of extreme virulence. In all of these a more or less general tuberculosis developed. In a third series 6 guinea-pigs received an intrasplenic injection of several drops of a triturate of the tuberculous spleen of a guinea-pig dead of experimental tuberculosis. In practically all of these cases there were found, after 1 to 1½ months, caseous tuberculosis of the spleen and fresh tuberculosis of the liver. In no case were any tuberculous lesions found elsewhere. These results show that, according to individual conditions of virulence of the bacilli, splenic tuberculosis may remain limited to this organ or extend to the liver in a strictly splenohepatic type, or, passing onward, may become disseminated.

Congenital Hepatic Cirrhosis with Obliterative Cholangitis.—Rolleston and Hayne² report a case of congenital hepatic cirrhosis with obliterative cholangitis (congenital obliteration of the bile-ducts) in a male child aged 6 months. The child had been jaundiced since birth. The liver and spleen were much enlarged, but there was no ascites. At the necropsy the liver was nearly twice its normal weight and the seat of mixed monolobular and multilobular cirrhosis. The common bile-duct was obliterated. Discussing the hypotheses advanced to account for the condition, it is concluded that the disease primarily is started by poisons derived from the mother and conveyed to the liver of the fetus, and that a mixed cirrhosis and cholangitis is thus set up. In some cases, especially those fatal in early life, obliteration of the bile-duct has not been effected, and cirrhosis may alone be found. Possibly in some cases the

¹ Arch. de Méd. Exp. et d'Anat. Path., XIII, 321, 1901; Am. Jour. Med. Sci., CXXII, 468, 1901.

² Brit. Med. Jour., Mar. 20, 1901.

cholangitis does not occur, and in this way certain cases of cirrhosis in early life are accounted for. In other cases the development of the obliterative cholangitis may be much delayed. It is believed that there may be several conditions included at present under the term congenital obliteration of the bile-duets, and that some may be due to constriction of the duct by bands (localized peritonitis), and that some of these deserve the title congenital obliteration of the bile-duets more than do some others.

Pigmentation Cirrhosis of the Liver in a Case of Hemochromatosis.—Abbott¹ reports a case, of which the principal histologic features were more or less fibrosis of all the organs except the kidneys, associated with a greater or less degree of hemosiderosis. In both the liver and the pancreas the heavy pigmentation of the connective tissues had its source, in part at least, in the broken-down pigmented cells of the parenchyma. Although there was a fairly advanced chronic interstitial pancreatitis, there was not the clinical picture of diabetes so common in cases of hemochromatosis. After a review of the literature the author concludes that in general hemochromatosis some primitive agency, as yet unknown, is at work and leads to (*a*) an increased destruction of hemoglobin either within localized hemorrhages or within the blood stream, or, perhaps, sometimes within the parenchymatous cells themselves, and (*b*) a degeneration of the cells of certain organs by which they become unable to throw off the granular pigment deposited within them, and becoming overloaded, finally disintegrate. It is believed that the cirrhosis partakes of the nature of a chronic interstitial inflammation, secondary upon the presence in the tissues of pigment set free after the destruction of the parenchymatous cells—an opinion recently expressed also by Kretz. In other cases referred to by Abbott, as well as in other cases reported in the literature, hemosiderosis of the liver cells was observed to be associated with a history of intestinal disturbance, and in some cases with prolonged suppuration. These facts suggest that the primitive agency, leading alike to the blood destruction and to cell degeneration, may be bacterial in its nature.

Experimental Bacillary Cirrhosis of the Liver.—Hektoen² reports 2 cases of cirrhosis of the liver in animals produced by 2 different bacilli. The one bacillus belongs to the colon group and was isolated from a guinea-pig dying spontaneously. In those animals which died early, after being inoculated with this organism, necrotic and degenerative changes only were present; in those living longer, proliferation of connective tissue was associated with necrosis; and in other animals cirrhosis entirely replaced the degenerative changes. These effects were observed only in guinea-pigs, showing well the influence of species; and the effects were caused by inoculation of living as well as of devitalized cultures. The second bacillus, which belongs to the pseudodiphtheria group, was isolated from the lesions of a case of blastomycetic dermatitis. Inoculations in various ways with this bacillus and its products

¹ Jour. of Path. and Bact., VII, 55, 1901.

² Jour. of Path. and Bact., VII, 214, 1901.

were found to produce with a fair degree of constancy more or less necrosis and diffuse cirrhosis of the liver in guinea-pigs and other animals. These observations are of interest in that they suggest the possibility of a similar course of events in some instances of human cirrhosis. A similar more or less acute infection in man may induce a diffuse growth of connective tissue in the liver. While the bacteria may be destroyed, and the immediate effects of their presence may pass away, the newly formed tissue in the liver remains, and as it contracts, a vicious circle is established—*i. e.*, the pressure of the resulting fibrous tissue causes a necrobiosis of the hepatic cells which in turn leads to renewed, progressive, connective-tissue proliferation. With time, and perchance aided by other factors, extensive contraction of the liver may result.

Experimental Production of Hepatic Cirrhosis.—Harley,¹ from a study of the experimental production of hepatic cirrhosis, states that when a single bile-duct is ligatured the portion of the liver remaining outside of the area of ligature remains unaffected, while the following changes occur in the ligatured area: (1) A development of interlobular fibroid tissue; in this tissue small collections of multipartite nuclei are occasionally met, but such collections form but a small fraction of the interlobular tissue. (2) The larger bile-ducts become dilated, and there is a marked hyperplasia of the smaller bile-ducts lying between the lobules, which become tortuous and appear considerably increased in number. (3) The hepatic lobules atrophy, the atrophy commencing at the periphery and proceeding from without inward. (4) The rapidity with which these changes develop and their intensity vary considerably in different animals of the same species, though the operative procedure be the same in all cases. (5) The functions of the liver cells in the atrophied lobules still continue, as is shown by the elimination of sodium sulfindigotate, by the presence of bile in the larger bile-ducts, and by the unaltered aspect of the liver cells. All of these features are observable even when extreme cirrhosis has occurred. The author believes that the mode of production of cirrhosis after ligature of a single bile-duct is as follows: (1) The interlobular fibrosis is attributable to the continued slight irritation set up by bile that passes through the walls of the smaller bile-ducts by osmosis, caused by the increased pressure of the bile resulting from the ligature (rupture of the smaller bile-ducts probably is not an effective factor in experimentally induced cirrhosis); (2) the dilation of the larger bile-ducts and the marked increase of the smaller ones are, in part, at any rate, directly due to the ligature, and are comparable to the extreme elongation and increase in size of the veins and venules that are seen in varix of the lower extremities and in varicocele (the writer's observations so far have failed to afford proof of other modes of formation of the interlobular bile-ducts); (3) the atrophy of the lobules is due chiefly to the irritant effect of bile that has passed out of the bile-ducts and that acts principally, if not almost exclusively, upon the peripheral portion of the lobule. It appears that pressure on the lobules caused by the newly formed in-

¹ Jour. of Path. and Bact., VII, 203, 1901.

terlobular fibrous tissue is not an important factor in causing the atrophy.

Tuberculous Cavities in the Liver.—Fletcher,¹ reporting a case of tuberculous cavities in the liver, reviews briefly the literature of the subject. He believes that the lesions in his case were the result of a recent infection by the hepatic artery; an older infection through the portal vein, probably associated with intestinal lesions and resulting in the formation of tubercles in the portal spaces; next, a destruction of the walls of the bile-ducts with the formation of a cavity filled with bile-stained caseous material; and secondarily the production of a localized cholangitis.

The Relation of Chronic Interstitial Pancreatitis to the Islands of Langerhans and to Diabetes Mellitus.—Opie's² conclusions are: (1) The islands of Langerhans are composed of cells having the same origin as those of the glandular acini, but forming structures which are independent of the secreting apparatus and in intimate relation with the vascular system; (2) in the splenic end of the cat's pancreas they have a definite position within the lobule, each of which contains one of these structures; (3) in the human pancreas they are more numerous in the splenic extremity or tail than elsewhere; and (4) prolonged stimulation of the gland does not, as claimed by Lewaschew, transform groups of acini into the islands of Langerhans. Opie further concludes: (1) Congenital syphilitic pancreatitis retards the development of the glandular acini, but does not affect the islands of Langerhans. Embedded in the stroma, but not invaded by it, the latter maintain their continuity with the small ducts and acini with which they have a common origin. (2) Two types of chronic interstitial inflammation affecting the developed pancreas are distinguishable: (*a*) Interlobular pancreatitis, in which the inflammatory process is localized chiefly at the periphery of the lobule and implicates the islands of Langerhans only when the sclerotic process has reached a very advanced stage; in pancreatitis following obstruction of the ducts the islands long remain unaltered, though embedded in dense scar-like tissue; (*b*) inter-acinar pancreatitis, in which the process is diffuse, invades the lobules, separates individual acini, and implicates the islands of Langerhans. (3) A relationship has been observed between lesions of the islands of Langerhans and the occurrence of diabetes mellitus: (*a*) In 1 of 11 cases of interlobular pancreatitis diabetes of mild intensity occurred. The sclerosis, which in this case followed obstruction of the ducts by calculi, was far advanced and affected the islands of Langerhans; (*b*) in 2 of 3 cases of interacinar pancreatitis diabetes was present, and the third case was associated with a condition, hemochromatosis, which at a later stage is associated with diabetes, the result of pancreatic lesions; (*c*) in a fourth case of diabetes hyaline deposits between the capillaries and the parenchymatous cells had so completely altered the islands of Langerhans that they were no longer recognizable. It is believed by

¹ Jour. of Path. and Bact., vi, 146, 1900.

² Jour. of Exper. Med., v, No. 4, 1901.

Opie that lesions of the islands of Langerhans are intimately related to the etiology of pancreatic diabetes. In a second communication Opie¹ reports a case of diabetes in a negro, aged 54, in which he found marked lesions in the pancreas. There was only a limited increase of connective tissue, but the islands of Langerhans were the seat of an advanced hyaline degeneration. Opie believes that in this case the pancreatic change stood in a causal relation to the diabetes, although he does not go so far as to say that impaired pancreatic function is the only cause of diabetes, or that diabetes is always present when there is pancreatic disease.

A case of inflammation, hemorrhage, and multiple fat-necrosis of the pancreas, due to staphylococci, and forming part of a general sepsis produced by this bacterium, is reported by Leonhardt.²

Experimental Pancreatitis.—Flexner and Pearce,³ from an extensive study of the subject, conclude that pancreatitis follows upon a variety of insults to the pancreas, and may develop with great rapidity. The introduction of such a foreign body as artificial gastric juice into the pancreas gives rise to degeneration, hemorrhage, and emigration of leukocytes within the brief space of 1 or 2 hours. Chronic inflammation of the pancreas may result from the more remote effects of agents which, acting with greater intensity, produce fatal acute inflammations. Perversion of the course of normal secretions, whereby they enter the pancreas, is efficient cause of pancreatitis. The presence of blood alone in the tissues of the pancreas does not set up an acute inflammation. The tendency is for the rapid production of a chronic proliferative inter- and intracinar pancreatitis. The effects of blood are not produced by blood-serum separated from the corpuscular elements. The spleen has no influence upon the development of pancreatitis and the production of fat-necrosis. Fat-necrosis attends all forms of pancreatitis, and is more widespread the more acutely the pancreatic lesions develop; it may appear as early as 8 hours following injury to the pancreas. Glycosuria appears quickly after injury to the pancreas, and may persist for several days and then disappear, although the pancreas has suffered permanent partial injury.

Hydatid Cyst of the Pancreas.—A case of this kind, apparently the first in medical literature, is reported by Peters.⁴

The Histology of Acute Suppurative Peritonitis.—Walbaum⁵ details the results of his investigation of 45 cases of purulent peritonitis undertaken to ascertain the portions of the intestinal wall affected in the process and the lesions, if any, of the cells of the intestinal plexuses. It was found that in almost all cases the subserous layer of the intestinal wall is actively implicated in the inflammatory process, the most conspicuous lesions being cellular infiltration, proliferation of the fixed cells, fibrin formation, and hemorrhage. The muscular coat usually escapes. If the process does not lead rapidly to death, marked

¹ Jour. of Exper. Med., Mar., 1901, p. 527. ² Virchow's Arch., CLXII, 299, 1900.

³ Univ. of Penna. Med. Bull., XIV, 193, 1901.

⁴ Canada Pract. and Rev., 1901, 84.

⁵ Virchow's Arch., CLXII, 501, 1900.

alterations of varying nature and severity occur in the nerve-cells of the intestine—vacuolation, dropsical degeneration, chromatolysis, etc.

Peritonitis.—A splendid and exhaustive review of the literature of peritonitis covering the period from 1885 to 1900 is given by von Bruns.¹ A total of 722 literary references are considered.

THE RESPIRATORY TRACT.

Nasal Tuberculosis.—Renshaw² expresses the opinion that primary tuberculosis of the nasal mucous membrane occurs not so infrequently as is generally supposed. He has demonstrated that the simple introducing of tubercle bacilli into the nostril of a susceptible animal, without any abrasion, may cause tuberculous infection. Infection having occurred, the disease tends to run a slow course. Probably the farther from the nostril the seat of the lesion is situated, the more rapid the course of the disease, and the earlier the invasion of other organs. The system, as a rule, is invaded by means of the lymphatics, though occasionally by other routes.

The Bacteriology of Bronchitis.—From a study of 49 cases of bronchitis, Ritchie³ concludes that bronchitis is an infective disease. It is not due to any specific microorganism—different organisms being found in the bronchial secretion, some of which are the cause of the disease. The most important causal bacteria are *Diplococcus pneumoniae* and streptococci. The influenza bacillus, however, not infrequently causes bronchitis apart from epidemic influenza. The disease is more often due to mixed infection than to a monoinfection.

Necrotic Bronchopneumonia with Streptothrix.—Norris and Larkin⁴ report 2 cases of necrotic bronchopneumonia in which streptothrices were found. One was in a man of 45, the other in a man of 23. The pneumonias were characterized by intense catarrhal and necrotic inflammation of the bronchi, and by the presence of numerous streptothrix colonies in the bronchial canals. Introduction of the bronchial material of the first case into the tracheas of 3 rabbits induced pulmonary abscesses and empyema of the pleura and pericardium in 1 of the animals. Material from the second case, introduced into the ear-vein of a rabbit and into the trachea of another, likewise induced pulmonary abscesses and empyema, the pus from these animals containing filaments and rods identical with those composing the original colonies in the human cases. The streptothrix was not obtained in pure culture from the human cases, but was associated with the streptococcus; but from the rabbits a pure culture was obtained. The authors believe that their streptothrix is either identical with or closely related to *Streptothrix Israeli* and to the species isolated by Kruse. The pulmonary lesions were not like those of actinomycosis. The article is illustrated.

¹ Centralbl. f. allg. Path. u. path. Anat., Jan. 22 and Feb. 8, 1901, xi, 1 u. 2.

² Jour. of Path. and Bact., vii, 142, 1901.

³ Jour. of Path. and Bact., vii, 1, 1901. ⁴ Jour. of Exper. Med., Oct. 25, 1900.

The Increase of Elastic Tissue in the Lung in Chronic Passive Congestion.—Pearce,¹ having examined, by Weigert's method, a large number of sections of healthy lungs as well as lungs affected with chronic passive congestion, concludes that the increase in density of the lung occurring in chronic passive congestion is due to newly formed elastic tissue. This tissue is found to be increased in the finer structures of the lung in all cases of the disease, and in marked cases an increase is observed also in the pleura, intrapulmonary septa, blood-vessels, and bronchi. The increase is progressive, depending on the age and degree of the congestion, and it apparently indicates an effort to strengthen the walls of the air-passages, supporting the overfilled capillaries, and preventing the collapse of the air-cells.

The Pigment in Brown Induration of the Lung.—Neumann² details the results of his examination of the pigment that occurs in the lung in chronic passive congestion, with special reference as to whether it may lose its power to give the iron reaction and change into a melanotic pigment. He found, however, that in brown induration of the lung, in addition to coal dust, there occurs but one pigment, which differs in no way from hemosiderin that may develop in any part of the body after extravasations. In regions in which no coal dust is present, the particles of hemosiderin are found within the large "Herzfehlerzellen" in the pulmonary alveoli; when coal dust is present, the masses of pigment are chiefly in the connective tissues. Minute examination of the masses of pigment reveals that each is made up of a central particle of coal dust or carbon surrounded by an area of lighter yellowish pigment—hemosiderin. The central black area of these masses of pigment is the result of melanotic transformation of hemosiderin.

Mixed Infection in Pulmonary Tuberculosis.—Von Weismayr³ details the results of a bacteriologic examination of 100 specimens of sputum from 81 patients suffering from pulmonary tuberculosis. The sputum from 35 of the 81 patients revealed the tubercle bacillus alone; that from 20, the tubercle bacillus and *Streptococcus pyogenes*; that from 13, the tubercle bacillus and *Staphylococcus pyogenes aureus* and *albus*; that from 10, the tubercle bacillus, streptococcus, and staphylococcus; and that from 3, the tubercle bacillus, staphylococcus, and *Micrococcus tetragenus*. These results show that a number of tuberculous patients suffer from mixed infection. All the secondary infective agents exert a marked influence on the course of pulmonary tuberculosis; in particular, cavity formation and elevation of the temperature are the direct result of, or are hastened by, such secondary infections. The prognosis is rendered worse by the detection of secondary infections. Patients with such secondary infection are not suitable for sanatorium treatment. Secondary infection may be the cause of laryngeal invasion, in that all laryngeal cases presented secondary infection.

¹ Jour. of Med. Research, new series, I, 258, 1901; Univ. of Penna. Med. Bull., XIV, 228, 1901.

² Virchow's Arch., CLXI, 422, 1900.

³ Zeit. f. Heilk., XXII, 105, 1901.

Experimental (Aleuronat) Pleuritis.—As a result of a series of experiments undertaken especially with a view to the study of the cellular exudate of pleuritis, Coenen¹ concludes that the injection of a sterile emulsion of aleuronat into the pleural cavity of a rabbit produces a sterile, suppurative pleuritis, characterized by rapidity of defervescence, and by the fact that *restitutio ad integrum* without the formation of adhesions occurs. The exudative phenomena reach their height by the end of the second day and then gradually lessen. At about the same time the first evidences of proliferation of the fixed connective-tissue elements manifest themselves, and as these develop the leukocytes recede. Giant cells do not develop until the fourth day, and they present themselves about the granules of aleuronat which act as foreign bodies. The endothelium of the pleura is regenerated from rests of the old endothelium and not from fibroblasts. The freshly emigrated leukocytes are almost entirely pseudoeosinophile; their granules, however, are not amphophile in the original sense of Ehrlich, but each cell contains both acidophile and basophile granules. True eosinophile leukocytes, which, however, are much fewer in number, are present from the beginning in both the inflammatory zone and in the exudate. Their absolute number remains unchanged throughout the process, but later, on account of the disappearance of the pseudoeosinophile cells, they appear relatively increased. While the pseudoeosinophile and the true eosinophile leukocytes exhibit similar chemotactic properties qualitatively, they nevertheless exhibit quantitative differences; and both exhibit chemotactic properties different from those of the lymphocytes, which according to Ribbert occur in the late stages of chronic processes. Should one assume as additional chemotactic differences that the digestion leukocytosis is caused solely by the lymphocytes (Virchow); and as additional chemic differences that the polymorphonuclear leukocytes give the guaiac reaction, whereas the lymphocytes do not; and further, the fact that the polymorphonuclear leukocytes have an ameboid motion, possess specific granulations (Ehrlich), and, in contrast to the lymphocytes, bactericidal properties, and the ability to include within themselves bacteria (Wauters), there is sufficient foundation for the view that the different varieties of leukocytes are different in nature.

The Diseases of the Bronchial Glands.—A careful study of this somewhat neglected subject is published by Hall.²

The Pathology of Exophthalmic Goiter.—After a critical discussion of the different theories that have been advanced to explain the causation of exophthalmic goiter, Gley³ concludes that the affection is due to an alteration in the thyroid apparatus, involving in the first place the parathyroid, whose normal function is thought to be disturbed. The exact nature of these functional disturbances of the parathyroid and their relations to the sympathetic nervous system are as yet to be ascertained. It is significant, however, that in exophthalmic goiter the thyroid contains only $\frac{1}{10}$ as much iodoproteid as normally. Edmunds⁴

¹ Virchow's Arch., vol. CLXIII, 84, 1901.

² Phila. Med. Jour., Dec. 1, 1900.

³ Brit. Med. Jour., II, 771, 1901.

⁴ Brit. Med. Jour., II, 773, 1901.

details the results of some experimental researches during the course of which he removed the thyroid and parathyroids from dogs, and a short time thereafter removed and examined the spinal cord and the medulla. The changes detected were similar to those occurring in some forms of acute poisoning, from which it appears that athyroidea is a form of acute poisoning affecting the central nervous system. From the fact that the acute nervous symptoms can be produced by the excision of the parathyroids alone, it seems probable that the absence of the parathyroid secretion is in some way the cause of the acute symptoms, and from the nature of the changes in the cells it seems that it acts by its presence being necessary to the extraction from the blood and deposition in the cells of the Nissl's bodies, which are supposed to be the food of the cells. Gley having shown that there is a large amount of iodine in the parathyroids, it is natural to suppose that iodine plays an important part in these chemie changes. In Graves' disease the colloid of the enlarged thyroid resembles that of the "compensating" hypertrophy of the thyroid of experiments in not staining so deeply as does normal colloid; it has, in fact, undergone a chemie change. It is stated that the symptoms of Graves' disease so much more resemble the nervous symptoms following excision of the parathyroids than myxedema, which we know to be due to defect of the thyroid proper, that it suggests itself that Graves' disease is due to partial aparathyroidea.

THE NERVOUS SYSTEM.

The Origin of Gas and Gas-cysts in the Central Nervous System.—Howard¹ reports 5 cases of brain-cysts caused by bacteria, of which 4 were due to *Bacillus aerogenes capsulatus*, and 1 to *Bacillus mucosus capsulatus*. In addition, he reports 2 cases of gas in the blood-vessels of the brain (and in the disorganized brain-tissue in 1 of the cases) in association with general gaseous emphysema, in both of which *Bacillus aerogenes capsulatus* was present—in pure culture in 1 case, and associated with *Bacillus capsulatus mucosus* in the other. Howard states that while it is impossible to determine what proportion of brain-cysts unassociated with hemorrhage, atrophy, or nondevelopment of brain-tissue, and the disintegration of tumors described by previous writers, are due to gas-producing microorganisms, the descriptions and illustrations of the cysts in many of the cases correspond in a remarkable manner to those of the gas-cysts of the brain described by Reuling, Herring, and himself. More frequent and more careful examination of the brain at necropsy, especially in cases of general gaseous emphysema, probably will show that gas-cysts of this organ are more common than is generally supposed.

The Lipochrome of the Nerve-cells.—Having previously shown that the granular pigment of the nerve-cells is probably fat, Rosin and Fenyvessy² undertook a series of investigations to confirm, if possible,

¹ Jour. of Med. Research, new series, I, 105, 1901.

² Virchow's Arch., CLXII, 534, 1900.

their earlier opinions. By means of Sudan III they were enabled to stain the nerve-cells in frozen sections a bright scarlet-red color. Certain bodies in the outer coats of the blood-vessels also took the red color, whereas the myelin sheaths stained a pale red. In sections treated with absolute alcohol and ether the pigment could not be demonstrated, indicating its true fatty nature.

The Pituitary Gland in Akromegaly and Gigantism.—From a study of the literature, especially of 19 cases of akromegaly in which careful microscopic investigation of the enlarged pituitary gland was made, Woods Hutchinson¹ concludes that in akromegaly and gigantism the pituitary body is still functional; that disturbances of its metabolism are the principal factors in both, the difference between the results being simply due to the stage of individual development at which the disturbances of its function begin; that the nature of the overgrowth in both diseases is primarily on the order of a pure functional hypertrophy, later, however, losing some of the definitiveness of its impulse, and either producing immature tissue of a mixed type or resulting in simple hemorrhagic exudation, with either cyst formation or complete breaking down of the tissue mass. It seems probable, although upon this head the evidence is still uncertain, that some part is played by this body in "dwarfism," rickets, and the dwarf bones of cretinism; that a reflex disturbance of its function may possibly underlie the dystrophy accompanying pharyngeal adenoids; and that it would appear to be a sort of "growth center" or proportion regulator of the entire skeleton.

Spinal Cord Changes Following Amputations.—Switalski² reports the results of an examination of 5 spinal cords removed from subjects upon whom amputations had been performed—4 amputations of the thigh, and 1 of the leg. In every case there was found atrophy of one-half of the spinal cord corresponding to the side of the amputation, both the white and the gray matter being implicated in the atrophy. In 3 cases the atrophy was traceable from the lumbar part of the cord to the dorsal region, and in 2 cases up to the cervical region. Coincident with the atrophy there occurred a sclerosis of the posterior columns—in 3 cases in all levels of the cord, in 2 cases in the cervical region. While the spinal hemiatrophy showed a tendency to diminish from below upward, the sclerosis of the posterior columns increased from below upward. Pierre Marie also draws attention to the occurrence not only of atrophy, but also of sclerosis after amputation, and states that such sclerosis may be noticeable even on the opposite side of the cord.

Suppurative Myelitis and Bronchiectasis.—Chiari³ gives a brief review of the literature of suppurative myelitis and reports a case that came under his personal observation. Of 14 cases reported, 3 were traumatic in origin, and 3 were due to direct extension of lesions from outside the cord. Of the remaining 8 cases, 3 were the result of metastasis in cases of bronchiectasis. In the case reported by Chiari there

¹ N. Y. Med. Jour., LXXII, July 21 and 28, 1900.

² Rev. Neurol., Jan. 15, 1901.

³ Zeit. f. Heilk., XXI, 351, 1900.

were suppurative inflammation of the brain and cord, abscesses of the cerebellum and abscesses of the cord, and in the lower lobes of the lungs many bronchiectatic cavities and fusiform dilations of the bronchi. Cover-slip preparations and cultures from the pus in the abscesses and in the bronchiectatic cavities revealed *Micrococcus lanceolatus*. In the walls of the abscesses of the cerebellum and the cord, in addition to the micrococcus, there were found partly within the blood-vessels and partly within the perivascular spaces, many clumps of fine, branching threads, that stained by Gram, and resembled the actinomyces. It was evidently a manifestation of metastasis from the bronchiectasis. The case suggests the wisdom of investigating the bacteria present in cases of bronchiectasis; in some of these cases the actinomyces may be found, because of the frequent association of myelitis and bronchiectasis, and because of the proneness of the actinomyces to infect the nervous system. Reference is made to a case in which a streptothrix was isolated from the bronchiectatic cavities and from an associated brain abscess.

Pathology of Insolation.—Van Gieson,¹ in referring to the pathology of sunstroke, considers two theories: (*a*) the caloric theory, and (*b*) the toxic theory. According to the former the symptoms are brought on by the direct action of excessive heat on the body, this producing characteristic destructive lesions in the cerebral and spinal nerve-cells. The latter explains the symptoms as being due to a toxic or antitoxic agent circulating in the blood and acting on the nerve-centers, especially those governing the heart and blood-vessels.

The Pathogenesis of Tabes and Allied Conditions of the Cord.
—Watson² holds that tabes is not a "nervous" disease in the sense usually comprehended, and that the lesions in and around the vessels are of primary importance, the lesions of the neurons being determined by local interference with the blood-supply. This does not exclude the consideration of a varying vitality of the neurons as an important factor in the etiology of the disease. Further, he states that there is good ground for the belief that the condition is dependent upon a chronic autointoxication, the vascular lesions being to some extent general, but tending to be more advanced locally, and that the more advanced local changes determine a failure of nutrition in the adjacent nerve elements. If these views be correct, the condition ought to be curable in the early stages. The present tendency to differentiate tabes sharply from many other diseases in which there is a well-marked lesion of the cord is to be deprecated. The effort should be made to investigate the nature of the different toxins and the conditions that bring about variations in the result of their action.

So-called Miliary Sclerosis of the Spinal Cord.—Turner and Hunter,³ reporting a case of so-called miliary sclerosis combined with meningomyelitis and marked chromatolytic changes in the ganglion cells, express the opinion that the condition of miliary sclerosis, as de-

¹ Lancet, July 28, 1900.

² Brit. Med. Jour., June 1, 1901.

³ Jour. of Path. and Bact., vi, 368, 1900.

scribed by Tuke, Rutherford, Kesteven, and others, is not a sclerosis, as the term is now applied, but an amyloid degeneration. It is associated with arterial occlusion and appears to be directly due to impaired tissue nutrition. It is a rare indication of syphilitic affection of the nervous system.

The Histology of the Myotonic Hypertrophic Muscle of Thomson's Disease (Congenital Myotonia).—Koch¹ reports an interesting case of Thomson's disease, together with the results of a careful microscopic study of excised portions of muscle. In many respects the histologic findings in his case differ from those described by Erb and others. The most characteristic feature of the case was hypertrophy of most of the primitive muscle-fibers; but in addition there were muscle-fibers that revealed degenerative alterations, the result either of simple atrophy, of marked nuclear proliferation, or of the formation of columns of muscle-cells. Transverse sections of the myotonic muscles showed also regenerative phenomena—longitudinal cleavage, splitting off of many fibers, formation of numerous rows of nuclei, and hypertrophy of the fibers themselves; proliferative changes of the striated muscle therefore predominated. It is believed that these changes may explain the peculiar myotonic disturbance of the muscles. One may presume that a muscle in which there occur such degenerative and regenerative processes is not capable of such functional activity as is a muscle in which such processes do not occur. A muscle-fiber into which a capillary blood-vessel penetrates, and which is about to split up into two or three parts, is scarcely capable of such contraction as is a normal muscle-fiber. That such a fiber should contract slowly and sluggishly is but a hypothesis—a hypothesis with some elements of probability.

¹ Virchow's Arch., CLXIII, 3-0, 1901.

NERVOUS AND MENTAL DISEASES.

BY ARCHIBALD CHURCH, M.D.,

OF CHICAGO.

SYMPTOMATOLOGY AND SYMPTOMATIC DISORDERS.

Nervous Rapid Breathing.—Rechzeh¹ catalogues 40 cases of nervous rapid breathing observed in Gerhardt's clinic. These occurred in a list of 1155 patients suffering from functional nervous diseases. All cases of organic dyspnea were excluded, and he distinguishes between the two conditions by remarking that the nervous form of rapid breathing is not influenced by inhalations of oxygen. The cases embraced 14 males and 26 females. The lowest number of respirations per minute in these 40 cases was 40, from which number they ran up well toward the hundred mark. The women, as a rule, were suffering from hysteria and other neuroses, including 2 cases of Graves' disease; the men, from traumatic nervous disturbance. The ages of the women averaged 23, of the men 26½ years. A neurotic family history, addiction to alcohol, depression, sexual disturbances, and other constitutional conditions were present. The type of breathing varied in different cases; in many the inspiration and expiration were of equal length, no pause being detected. The breathing, as a rule, was costal and the capacity of the lungs was lowered. Rapid heart was generally present, but not always. Stomach and intestinal disorders, especially diarrhea, occurred in 70% of the cases, and vomiting was also noted. The nutrition of the patient apparently did not suffer. The diagnosis is considered an easy one and the prognosis generally good. Even the worst cases show temporary improvement and an increase in body weight in nearly all instances. The patients usually were able to return to work after symptomatic treatment by morphin, bromids, sulphonal, etc., and generally hydrotherapy, electricity, and hygienic measures were valuable.

Astereognosis.—This symptom, which consists in an inability on the part of the patient to recognize objects by feeling or by contact with various surfaces of the body, is generally attributed to disorders in the parietal region, especially on the left side, and is somewhat analogous to mind-blindness. A case reported by W. H. Teller and F. X. Dereum² is somewhat confirmatory of the usual ideas. The patient, a healthy negro, was struck on the left parietal region, causing a depressed fracture of the skull. This was elevated and a certain amount of brain tissue escaped with a large clot from beneath the dura involv-

¹ Berlin. klin. Woch., 1901.

² Jour. Nerv. and Ment. Dis., Aug., 1901.

ing the parietal lobe. The patient made a prompt recovery from operative interference. He remained slightly hemiplegic. With closed eyes the patient fails to recognize any object placed in the right hand. Such commonplace objects as spools, thimbles, rings, balls, or penknives convey to him no impression when grasped. There is in the same location a slight blunting of sensation to pinpoints and some general reduction of cutaneous sensation in the right hand, wrist, and fingers, though the perception of heat and cold is fairly good. Knowledge of the position of the fingers on the right hand is also impaired and astereognosis is complete.

Charles W. Burr¹ discusses the disturbance of sensation which he proposes to call **stereognosis** instead of astereognosis. He outlines one or two cases and reaches the following conclusions, which fairly well cover the situation: (1) The ability to recognize objects by handling them depends upon the integrity of the afferent nerves, the cortical sensory area, and the cortical perceptive area. (2) Disease of either of these will make it impossible for the patient to recognize objects by handling them. (3) We may dismiss from consideration here the inability to recognize objects because of disease of the sensory nerves or of the sensory tracts in the spinal cord, medulla, and pons. Such inability is due to anesthesia of one or more types. (4) There is a distinct area of the cortex in which sensations produced by handling objects are grouped together to form tactile memory images. This, the tactile perceptive area, is in the parietal lobe. It is not the same thing as the sensory area, though it may be located within the boundaries of the latter. (5) It would probably be well to limit the term stereognosis to cases in which the inability to recognize objects by contact is due to some failure of sensation caused by brain disease either in the cortical sensory area itself or in the fibers going to it. (6) Tactile amnesia includes the cases in which, on account of disease in that tactile perceptive area, the tactile memory images are destroyed. It is not infrequently associated with mind-blindness, and indeed it is probable that always, in recognizing objects by handling them, we recall from memory a more or less faint recollection of the visual appearance of the object. Auditory memories are less frequently recalled, because less frequently needed to make a complete percept, and those of smell and taste quite rarely. (7) Which form of sensation is most necessary for the recognition of any given object depends upon the qualities of the object. Tactile anesthesia, if sensibility to stronger pressure is preserved, causes little or no difficulty. The space sense, the localizing sense, and the sense of position are probably the most important, for by them we learn the form of objects—the most important element in recognition. (8) When in the cerebral palsies of children there is inability to recognize objects in the paralyzed hand, it is often caused, as Oppenheim states, by the fact that tactile memory images were never acquired. (9) Granting that the tactile perceptive area is not the same as the cortical sensory area, such cases as the second reported here can be explained on

¹ Am. Jour. Med. Sci., Mar., 1901.

the hypothesis of a lesion cutting off the fibers joining the two areas. Walton¹ reports 2 cases of brain tumor marked by the symptoms of stereognosis. In these cases, as in those of Mills, the postsensory region was involved.

Muscular Atrophy in Tuberculosis.—Carcassonne² contends that the muscular wasting in tuberculosis shows numerous peculiarities and is not merely a general emaciation. In addition there are modifications of conformation, alterations of function, and changes in mechanical electrical excitability. The atrophy of the muscles is more marked in the scapulothoracic group, advancing with the evolution of the pulmonary conditions, being unilateral when one lung is affected and always most marked on the side which shows the most advanced disease in those instances in which both lungs are involved. The muscular condition may be of early appearance and furnishes an indication of some value as to the condition of the adjacent lung. The mechanism of the condition is explained by the author as alteration of the nerve-fibers to the pleura reacting upon the cord and thence through the branches to the muscles, in which process certain changes of a degenerative character occur in the cornual cells consisting in disappearance of the chromatophilic elements, displacement of the nucleus, etc., with subsequent changes in the nerves themselves.

Hiccough.—J. Noir³ considers protracted hiccough as a series of convulsive seizures due to toxic causes. He refers to Erb's method of treating it by faradization applied to the epigastrium, to the method of galvanization or faradization of the phrenic nerve, by passing a galvanic stream between the mastoid processes, to the method of compressing the left phrenic nerve, to the method of forcibly elevating the hyoid bone with the fingers, and Lepine's practice of traction upon the tongue. The author has met with success several times by this last plan. In one, a very nervous girl of 6½ years, who had violent hiccough for several hours and was exhausted to such a point that her relatives had given her up for dead, traction on the tongue for about a minute and a half calmed the disturbance as if by magic. In another case, diabetic, tuberculous, and cachectic hiccough had been severe for several days and was evidently toxic in origin. It resisted all forms of ordinary medicinal treatment, but yielded to traction on the tongue, reappeared several days later, but again ceased on practising the method.

Echographia.—A. Pick⁴ calls renewed attention to Bateman's contribution on the subject of echographia. The patient furnishing study for Pick was a weak-minded man of 18, able to read and write a little. He suffered gradual mental enfeeblement and lost the power of writing spontaneously or at dictation, but questions put him in writing or print he would copy, reproducing what was written in an echo-like manner, although apparently unable to comprehend the question. Another case was that of a man of 58, who during an operation for pharyngeal abscess had the left carotid tied. A right hemiplegia of

¹ Boston M. and S. Jour., Feb. 28, 1901.

² Arch. Gén. de Méd., Feb., 1900.

³ Progrès Méd., Jan. 6, 1900.

⁴ Rev. Neurol., Sept. 15, 1900.

moderate degree and a marked aphasia followed. The aphasia showed slight word-deafness, marked paraphasia, and complete paraphagia. Questions in writing he did not respond to, but could copy accurately. Pick considers the cerebral lesion in this condition to be a softening of part of the left temporal sphenoidal lobe. [A similar condition is frequently seen in the various aphasias when in attempts at writing the patient repeats a final word or letter.]

Acute Spinal Ataxia.—C. L. Dana,¹ in a study of acute spinal ataxia in its relation to other forms of acute ataxia, states that "acute ataxia occurs occasionally in *tabes dorsalis*, but is then associated usually with characteristic symptoms. Acute nontabetic ataxia occurs as a manifestation of spinal syphilis or senile arterial changes, and shows itself by a sudden onset of temporary motor weakness and bladder troubles, great ataxia, and minor sensory disorders. It may affect only one extremity, but usually affects the lower limbs. The tendency is to nearly complete recovery. Acute bulbar or bulbo-cerebellar ataxia occurs as a sequel of some acute infection, and is usually the beginning of some form of multiple sclerosis. Acute neuritic ataxia occurs as the result of multiple neuritis of the sensory type. It is seen usually in the nonalcoholic forms of neuritis, especially those due to metallic poisons, like arsenic, or to diphtheria."

Erythromelalgia.—H. L. Elsner² reports interesting instances of erythromelalgia. In one, the patient had a gangrenous finger and had been incapacitated by the pain. Amputation of the finger resulted in complete recovery. The author refers to Sternberg's experience with 6 cases of young individuals affected with the disease, 5 of whom presented spontaneous gangrene. In 2, microscopic examination revealed more or less arteritis obliterans without change in the accompanying nerves. The failure to find microscopic changes in nerve structures of the finger at the site of pain and other sensory disturbances after a duration of 2 years, as shown in one of these instances, is, as the author states, indeed surprising, but not at variance with other experience, and he refers to Sachs' dictum that "erythromelalgia is as much an arterial as a nerve disease." From his own experience and the literature the author states: In addition to the cases to which the writer has referred, the following are noteworthy: Schenk's case with ascending degeneration of the posterior columns of the cord; Woodnut's case was associated with myelitis; Collier reported 10 cases associated with various spinal, systemic, and indiscriminate lesions; Auerbach's 2 cases, in one of which a postmortem examination revealed degenerative changes in the posterior nerve roots of the lumbar and sacral nerves without degeneration in the cord substance, while the blood-vessels were found normal. This is the only necropsy of a case of erythromelalgia on record. Nieder reports a case of erythromelalgia with eye symptoms prominent—choked disc with vascular dilation; Eulenberg, 1 case of brain tumor with hemorrhagic retinitis and consequent changed visual field. Hoffman also mentions an interesting case of akromegaly associated with erythromel-

¹ N. Y. Med. Jour., Apr. 20, 1901.

² Med. News, Mar. 16, 1901.

algia, in which the patient was 23 years of age; she had had erythromelalgia since her sixth year, when finally the characteristic changes in the hands and feet of akromegaly followed. Henoch's case was one of erythromelalgia following hemiplegia and hemihyperidrosis, death finally resulting from angina pectoris; and Levy reports a case resting on a hysteric basis, and cured by hypnosis, in which erythromelalgia was associated with Raynaud's disease.

The Visual Centers.—A. Crispolti,¹ in making a careful study of the cortical representations of sight, reaches the following conclusions, which serve in some sense to explain certain clinical difficulties: (1) Ordinarily the internal half of the retina is supplied by fibers that cross to the opposite side of the brain, and the external half of the retina by direct fibers. In these cases unilateral lesion of the cortical center produces homonymous hemianopsia. (2) In certain cases the inner half of each retina is partly supplied by the crossed fibers; the outer half, by direct fibers and in part by crossed fibers. In such instances unilateral lesion of the visual center produces a bilateral homonymous hemianopsia attended by retraction in the visual field of the opposite eye corresponding to the most external portion of the retina. (3) In rare cases the crossed fibers of the optic nerve are greatly increased and may be double the number of direct fibers. They supply the two inner thirds of each retina, the external third being supplied by the direct fibers in part only. It appears that a direct fiber and a crossed fiber from this external third depend upon the bifurcation of the individual retinal cylinder axis arising from a single retinal cell, and the functional activity of both depends upon the integrity of each branch of this bifurcated neuron; therefore, in cases of unilateral lesions of the cortical vision center there is produced complete blindness of the eye opposite to the lesion, with decided peripheral retraction of the visual field on the same side.

Intermittent Limping.—S. Goldflam² contributes an important paper on this subject, giving the outline of 24 cases of this disorder, first described by the French under the term "claudication intermittente." The symptoms are usually paresthetic feelings, which are intensified by the erect posture and attempts at walking. Some patients may take but a few steps before the sense of pain and weakness in the legs and especially the feet prevents their going further. Others accomplish greater distances and then are compelled to rest. Usually the feet feel better in a dependent position, as when the patient is sitting or lying, contrary to the condition in erythromelalgia, and some patients can only sleep in a sitting posture or by allowing the feet to hang over the side of the bed. The disorder, which has long been known in veterinary medicine, has been found in horses to be due to disease of the aorta, especially aneurysm, interfering with the circulation in the hind extremities. Similar conditions, however, are unknown to man, but arterial diseased conditions of a chronic character have been found upon postmortem investigation. In Goldflam's 24 cases 13 showed no pulse in the dorsal artery of the foot on both sides. In 10 the right or left foot was so

¹ La Clin. Mod., No. 30, 1900.

² Neurol. Centralbl., Mar. 1, 1901.

affected, and only in 1 case was there an extremely weak pulse on both sides. The posterior tibial artery was pulseless 7 times on both sides, on one side in 4 cases, and in the remaining 9 cases it was difficult to determine its condition. Generally the affected feet were pale in color, sometimes entirely blanched, but in certain instances the appearance was cyanotic and occasionally suggestive of erythromelalgia. The entire vasomotor system was usually more or less disturbed and general arteriosclerosis was the rule. Some instances were very difficult to differentiate from Raynaud's disease, and it is not unlikely that in certain cases the two conditions are combined. Usually the affected legs were the seat of paresthesia; a feeling of cold, of pins and needles, of prickling, of numbness, was usually complained of by the patients, and occasionally intense pains were encountered. His youngest patient was 25 years old, the usual age being about middle life or toward 50. As to the pathologic condition, the author believes it is an endarteritis, yet commonly general arterial sclerosis is absent. Intimate association with diabetes the author finds uncommon, although it has been strongly insisted upon by previous writers. Nicotin-poisoning was formerly emphasized by Erb very strongly, and most of the author's patients were more or less excessive smokers, cigarette smoking being apparently specially pernicious. Withdrawal of tobacco, however, is not usually followed by any considerable improvement. Other etiologic features are no doubt associated. The author, for instance, has seen the affection in brothers, and Erb has also insisted upon an inherited disposition, a condition very well recognized in regard to the arteries of the brain in a somewhat similar condition. Most of the patients were of a neurotic make-up. In these 24 cases, 23 had no history or indication of syphilis. Probably specific infection does not figure much as an etiologic factor. Alcoholism is also extremely rare. The usually symmetric distribution of the affection lends importance to the nervous element or to the nervous disposition of the individual, upon which nicotin seems to exert an especially bad influence. In the majority of the cases that have been investigated histologically the nerves in the affected members were normal, though in some instances a degenerative process was found analogous to that commonly found in chronic arterial disorders. One of the unfortunate consequences of the disorder is a tendency to gangrene, and a number of patients have had to undergo one or many operations. Medicinal treatment seems to have but little value, and the alkaline iodids, which have such a well-founded reputation in chronic arterial changes, seem to give but little assistance in this condition. Warm baths are well borne and seem to do good. Massage and other similar local measures are indicated. In rare instances electricity in the form of the galvanic current has appeared to accomplish some good. Many cases present remissions, or the condition comes to a standstill and subsequently grows worse. In some of the younger patients improvement and practical recovery have taken place, but the disease is likely not only to cripple the patient seriously but to lead to gangrene mutilations.

H. Higier¹ furnishes a very important contribution on this subject and suggests the title, "**angiosclerotic paroxysmal myasthenia**," which he thinks is more properly descriptive than the French or German title usually employed. He reports a number of cases and concludes, among other things, that the majority of patients belong to the Jewish race; that women are rarely affected; that usually the age is in the twenties or more commonly later, from the fortieth to the fiftieth year; that the principal etiologic factor is a neuropathic disposition and a congenital weakness of the peripheral circulation apparatus. Undue fatigue of the legs, exposure to wet and cold, the abuse of alcohol and tobacco, are frequently active factors, while syphilis, gout, and diabetes play a small part in the etiology of the disorder. The principal symptom of the affection, pain, is of three sorts: (1) Pain upon walking; (2) permanent pain, which frequently takes the form of a painful paresthesia while the patient is at rest; and (3) pain which initiates and precedes true gangrene. The beginning of the ulceration and gangrene, generally called spontaneous gangrene, usually follows diffuse angiosclerosis in both upper and lower extremities and need not necessarily be confounded with the disorder in question. This condition extends over years, usually under the title of vasomotor or sensory neurosis, without clinically recognized changes of the arteries. In the differential diagnosis erythromelalgia and Raynaud's disease present the greatest analogies. Rational hygienic and dietetic measures, the avoidance of both psychic and physical causes, play a considerable part in the treatment. Gangrene not rarely requires surgical interference.

Adiposis Dolorosa.—C. Fere² arrives at the conclusion that the symptom-complex described by Dercum under the above title is the association of nerve-pain with obesity. He reports 4 cases at length showing that the two symptoms may develop at different times and run a course by no means concurrent. He calls attention to the fact that localized fatty tumors have often been described under the names of painful subcutaneous tubercle, irritable tumor, etc., and that in many instances the pain persists after their removal; in fact, it is the patient and not the tumor that is irritable. In one of Fere's cases the pain became more intense as the adipose tissue diminished. Another French writer has adopted the term Dercum's disease, and seems willing to accept it as an entity.

The Achilles-Tendon Reflex.—Babinski³ presents a study of the Achilles-tendon reflex. He maintains that its absence will serve to distinguish true sciatica from hysteric pseudosciatica and other painful affections about the lower extremity. He thinks that its absence is a point of great importance in the early diagnosis of tabes. In the examination of a long list of tabetics he only found 5 in whom the tendo-Achillis reflex was present when the knee-jerks were abolished.

Family Periodic Paralysis.—H. D. Singer⁴ reports in detail an instance of this rare disorder which corresponds to the type as seen

¹ Dent. Zeit. f. Nervenheilk., July, 1901.

³ Rev. Neurol., May, 1901.

² Rev. de Méd., Aug., 1901.

⁴ Brain, Summer, 1901.

on the continent of Europe and to the several important contributions that have been made in America. This is the first English case to be reported. The patient was a boy of 16, whose family and personal history showed nothing significant except that he had a tendency to cramps in the muscles of the legs in earlier years, especially upon going into the water. At the age of 14 he had his first attack of paralysis. These recurred at gradually decreasing intervals, until at the time of observation they would average two or three a week, lasting from 6 to 24 hours. The weakness always appeared in the lower extremities first, then affected the muscles of the trunk, finally spreading to the arms and neck. Rarely the face was slightly affected and the muscles of the large joints, elbows, and shoulders were usually first and more affected than the distal portions of the limbs. The extraordinary muscles of respiration finally became completely paralyzed and the breathing was purely diaphragmatic. Even the diaphragm, however, was weakened. After a varying period of hours the paralysis subsided in an inverse order. The heart-muscle, as in other cases reported (see previous YEAR-BOOKS), was also affected, as manifested by increased precordial dulness and a diffuse pulsation with reduction in strength of heart-sounds. During the attacks the electric responses of the muscles disappeared, and also the tendon reflexes, although in the intervals of the attacks all of these conditions were normal. There was also a tendency to subnormal temperature. In this instance, unlike those generally reported, there was no connection between the attacks and muscular exercise; on the contrary, when the patient was confined to bed the attacks were prone to appear. Examination of the excretions, following the methods of Crafts in this country, proved nothing except a diminution in the sum total of the urinary output. The feces did not contain the noxious properties isolated by Crafts, which in his experiments produced a similar paralysis in animals. The muscle-fibers showed an unusual tendency to fissure under the ordinary technical treatment for the microscope. The patient, unlike the majority of cases reported, did not show any marked muscular development, but was, on the contrary, somewhat slight. All treatment seemed to be unavailing, but the author believes that the scantiness of the urine during the attacks is an indication for diuretics. The article is completed by a valuable critical digest of the literature, made by F. W. Goodbody.

Trional-poisoning.—Stuart Hart¹ contributes a very important communication on the subject of **nervous disorders following the use of trional**. From the literature he collects a number of cases in which serious effects have been noticed after comparatively moderate doses of this drug, which is used with so much recklessness under the impression that it is devoid of danger. Schultz reports a fatal case in a woman of 54, who took 15 grains of trional daily for a month. The illness was marked by epigastric pain, vomiting, loss of flesh and strength, and hematorporphyrin in the urine. Hecker reports a case presenting progressive paralysis, probably multiple neuritis, following

¹ Am. Jour. Med. Sci., Apr., 1901.

the use of trional. It was marked by unsteadiness of gait, disturbance of speech, and general weakness, followed by recovery. Reinicke had a patient who took trional for 4 months. It resulted in headache, vertigo, epigastric pain, increased temperature, black urine containing albumin casts and blood, but ended in recovery upon withdrawal of the drug. Herting reports a fatal case in a woman of 30 who had taken sulphonal and later 15 grains of trional daily for a considerable period. The urine contained hematoporphyrin. Gierlick saw a patient with tremor, ataxia, mental depression, loss of memory, all of which disappeared 2 weeks after the withdrawal of trional. Stockton saw a case of acute ascending paralysis ending fatally. Hematoporphyrin was present in the urine. The patient had taken a small amount of trional. Putnam saw a fatal case following the use of sulphonal and trional. There was paralysis, muscular tenderness, great emaciation, and death from involvement of the nerves of the heart and respiratory apparatus. Autopsy showed no changes in the cord, but a well-marked degenerative neuritis. Hart's case was in a woman of 50 years, who took 15 grains of trional every other day for 2 months; in all, 450 grains. The disturbance began as an acute intestinal poisoning; following this there was acute inflammation of the kidneys, and following this the presence of hematoporphyrin. There was disturbance of the vagus and subsequent disturbance of the heart-muscle, resulting in dilation and valvular insufficiency; extreme emaciation, marked thickening of the joints, disturbance of reflexes, paresthesia, hypersensitiveness, tenderness of nerve-trunks, double foot-drop and wrist-drop, and reaction of degeneration abundantly confirmed the diagnosis of multiple neuritis. There were also severe epigastric and intestinal pains. The condition of the urine cleared up a few weeks after the withdrawal of the trional, and the other symptoms gradually improved, so that full recovery was finally secured after a year's illness. [In view of these conditions, which will no doubt receive abundant confirmation from the observations of others, the professional attitude toward trional, which is now used with absolute indiscretion by physicians and laymen alike, must be radically modified.]

C. G. Stockton¹ reports a case of **acute ascending paralysis with hematoporphyrinuria**, which should be grouped with other cases of disorder in the motor apparatus attended with more or less pain and secondary to the use of sulphonal or trional. In this instance, 2 days after taking 15 grains of sulphonal, in divided doses, which were supposed to have been vomited, the claret color of the urine appeared, although previously it had been very high-colored and dense. Later a gram of sulphonal was given and the following day a gram of trional, from which time the hematoporphyrinuria was constant until death, 2 weeks later. When the patient was admitted to the hospital, she gave a history of stomach trouble dating back 4 weeks. Two weeks before, she had been taken suddenly with a dull pain in the back and a feeling of numbness and tingling in the feet. This had recurred several days

¹ Am. Jour. Med. Sci., July, 1900.

and the patient lost strength and appetite. Upon examination the legs were found weak, and there were involuntary and unconscious evacuations of bladder and bowels, the patient not feeling the moisture. There were occasional shooting pains in the legs. She felt as if she were losing her speech, was tired and sleepy, although unable to sleep. Two days later all sensation and motion disappeared from the lower extremities, and both sensation and motion of the upper extremities were much diminished. She was clear mentally, but apprehensive. The urine had a claret color and she had previously been given trional and sulphonal as above indicated.

Henry Waldo¹ reports a fatal case of **hematoporphyrinuria**. The patient was a single male of 33, who had been in the habit for some years of taking hypnotics, chiefly sulphonal. He had developed pain and tenderness over the stomach, with nausea, vomiting, and constipation, and, becoming slightly delirious at night, the drugs having been withdrawn, finally developed a condition resembling delirium tremens. His urine resembled port wine, with an odor of chlorodyn, but presented no albumin and was negative for blood by the guaiacum test. Microscopically but a few crystals of uric acid were found. The spectroscope, however, showed bands similar to those produced by hematoporphyrinuria. The patient's bad physical state grew worse and bed-sores formed. The temperature varied from 99° to 104°, the abdomen was sunken, and the diaphragm scarcely moved. General convulsions occurred previous to death, epileptic in character, in the intervals of which the patient was unconscious and the heart very feeble. No urine was passed for 48 hours previous to the fatal issue. The illness from first to last presented 10 days of symptoms of acute gastric irritation followed by 2 weeks of the cerebrospinal symptoms of progressive ataxic paresis. A postmortem examination was not obtainable.

John Sutcliffe² reports a patient affected with acute melancholia who was given sulphonal in 40 to 80 grains a day for 6 days, smaller doses having had no effect upon the agitation and sleeplessness. Rapidly the classical symptoms of **peripheral neuritis** developed. Later these as rapidly disappeared and the periods of excitement returned.

Keith-Campbell³ reports a case of **hematoporphyrinuria** following the use of sulphonal, terminating fatally, only 20 grains of sulphonal having been given in two doses.

M. Rosenfeld⁴ reports a case of **trional-poisoning** in a woman aged 28 who was admitted to the Strasburg Psychiatric Clinic suffering from delusional insanity. A night dose of 15 grains of trional was ordered, and was taken irregularly for 2 months; then for a period of weeks it was given regularly, the patient having greatly improved mentally although still troubled with insomnia. The patient grew gradually weak, was confined to bed, and trional was discontinued. Involuntary urination took place repeatedly. The weakness increased and the patient died within a few days after going to bed. The day before her death the urine

¹ Brit. Med. Jour., June 15, 1901.

³ Jour. Ment. Sci., Apr., 1898.

² Jour. Ment. Sci., Oct., 1899.

⁴ Berlin. klin. Woch., May 30, 1901.

drawn by a catheter contained a pigment which proved spectroscopically to be hematoporphyrin; albumin, sugar, indican, diazo, and blood were absent. Postmortem examination revealed a remarkable smallness of all body organs. The central nervous system was macroscopically normal. There had been giddiness, unsteady gait, loss of reflexes, diaphragmatic respiration, and hematoporphyrinuria.

Church and Hutchinson¹ report a case of **trional-poisoning** causing limp paralysis, paresthesia, intestinal pains, hematoporphyrinuria, and terminating fatally. No gross or microscopic changes were found in central nervous organs or peripheral nerves.

DISEASES OF THE CEREBRAL MENINGES AND CRANIAL NERVES.

Pachymeningitis.—M. Raswedenkow,² in an examination of this question, from abundant material states that the elastic tissue of the dura, which is scant in childhood, becomes abundant with age. It is arranged chiefly in two layers, the internal and the external elastic membranes. The dura he considers as made up of seven layers: (1) Epithelial cells; (2) internal elastic layer; (3) capillary network; (4) collagenous fibers; (5) fibers of connective tissue containing lymph-channels; (6) outer capillary network; and (7) outer elastic layer. The internal elastic layer is notably thickened in pachymeningitis. Twelve cases were examined. The first pathologic change is proliferation of the epithelial layer, followed by fibrinous exudation and the formation of numerous thin-walled capillaries. At this stage organization may take place, constituting a condition of fibrinous proliferating pachymeningitis. Usually blood extravasation occurs from the thin-walled vessels, and this is prone to be repeated. In extreme cases blood-cysts and blood-tumors form and cause clinical symptoms—pachymeningitis hæmorrhagica. The author supports the view that extravasation of the blood is secondary to and dependent upon the inflammatory process, which is primarily caused by toxemia, and may be of an acutely infectious character, or may be due to such chronic poisons as those of tuberculosis and alcohol.

Migrainous Facial Paralysis.—G. J. Rossolimo³ reports a very interesting case of recurring facial paralysis associated with migraine. The condition seems to be analogous to the ophthalmoplegic migraine which has been well observed for many years. The patient was a woman of 28, the mother of 2 children, the daughter of a migrainous mother. Two brothers were markedly neurotic. She was subject to periodic headaches in early life after the pubescent age, which gradually grew more intense. The first attack of facial paralysis occurred at the age of 19. At this time she had an attack of migraine lasting a week. The pain localized itself under the left ear and streamed forward over the jaws. It was associated with a metallic taste in the mouth and

¹ Am. Med., Nov. 9, 1901.

² Ziegler's Beitr., Bd. XXVII.

³ Neurol. Centralbl., Aug. 16, 1901.

roaring in the ears, and was followed by a decided paralysis of the seventh nerve in all its branches, which lasted about 5 months. Three years later there was another similar attack of paralysis, lasting 5 months, preceded as in the first instance by prolonged hemicrania, and a third similar attack 2 years afterward, in 1900. In the intervals between the attacks of facial paralysis there were repeated attacks of migraine.

Ophthalmoplegic Migraine.—W. Seiffer¹ reports an interesting case of this affection. A man of 30 had suffered from typical migraine from the age of 8, and for 4 years had presented recurring oculomotor paresis, sometimes paralytic in character. No other symptoms of intracranial disease could be elicited.

Paralysis of the Spinal Accessory.—Pearce Bailey² reports a case in which division of the spinal accessory produced complete paralysis of both the sternomastoid and trapezius muscles, at least the portions above the line of the scapular spine. Ordinarily division of the spinal accessory produces an insignificant amount of paralysis, but in exceptional cases, owing to the fact that the trapezius, as in this instance, receives practically its entire innervation through this nerve, its division results in a serious disability.

DISEASES OF THE BRAIN PROPER.

Brain Tumor.—C. K. Mills³ presents an article on the localization of brain tumors with special reference to the parietal and prefrontal lobes. He reaches the following conclusions: "The diagnosis of the existence of a brain tumor can sometimes be made even in the absence of most of the general symptoms, such as optic neuritis, headache, vertigo, and vomiting, chiefly by the close study of localizing and invasion symptoms. Emotional states, even hysteric stigmas, are sometimes present in cases of brain tumor, and must not be given too much weight in differential diagnosis. Tumors of the posteroparietal region, and especially of the superior parietal lobule (parietal of Wilder), give as their most important localizing symptoms disorders of cutaneous and muscular sensibility, and especially astereognosis; other symptoms often present in such cases are the result of compression or invasion of adjoining regions. Tumors and other lesions implicating the angular gyre and the regions adjoining (the subparietal, first temporal, and medio-occipital convolutions) give as their main localizing symptoms word-deafness and word-blindness, with the usually accompanying speech-disturbances, lateral homonymous hemianopsias, and disorders of cutaneous and muscular sensibility, including astereognosis, although it is possible that these disorders of sensibility in the case cited may have been dependent upon invasion of the superior parietal lobule. Just as the centers for hearing, vision, and speech are more highly differentiated in the left hemisphere, so it is probable that the stereognostic sense is

¹ Berlin. klin. Woch., July 23, 1900.

² Ann. of Surg., May, 1901.

³ Phila. Med. Jour., Apr. 20, 1901.

more highly evolved in this hemisphere. A tumor strictly confined to the motor regions does not give objective sensory phenomena of a persisting character; the localizing symptoms of a growth so situated are motor, chiefly paralysis and monospasm, with also exaggerated deep and superficial reflexes. In tumors of the motor subcortex tonic spasticity is usually a marked symptom. Paresis or paralysis, and exaggerated reflexes with monospasm or unilateral convulsions, may also be present. Tumors of the prefrontal region, by which is meant the region entirely cephalad of the motor zone, chiefly give psychic symptoms of an especial character. When the tumor is situated on the left side, motor agraphia (or orthographia) and motor aphasia are usually present because of the compression or invasion of the posterior portion of the second frontal and of the third frontal convolutions; paralysis and other motor symptoms are often present late because of encroachments upon the motor region."

J. L. Steven¹ reports a case of brain tumor, in a boy of 9 years, in which **cerebral vomiting** was of daily occurrence for 6 months. It was unattended by nausea, distress, or straining.

H. Oppenheim² reports 6 **spurious cases** presenting such symptoms as Jacksonian epilepsy, monoplegia, optic neuritis, etc., suggesting the presence of a tumor in the motor brain cortex. The illness appeared in young persons and disappeared with or without treatment by iodids and bromids. These patients presented no evidence or history of congenital syphilis. In one case there were scrofulous manifestations and in one a tendency to tuberculosis. Oppenheim, however, suggests that the cause of symptoms in his cases may have been a curable form of tuberculous meningoencephalitis, and adduces evidence from modern surgery showing a possibility of tuberculosis limited to certain portions of the brain unaccompanied by tubercular lesions in other parts of the body. The chronic onset and absence of fever led him to exclude an acute nonsuppurative encephalitis, although recovery from that condition is not rare.

E. R. Williams³ reports an interesting case in which atrophy of both optic nerves, following upon **choked disc** in a case of brain tumor, subsequently presented an acute optic neuritis. A careful search of the literature discovers but 3 or 4 similar cases. In the instance in question the tumor was one of large dimensions, affecting principally the corpus callosum, a large part of which was totally destroyed. The apex of the growth appeared in the interpeduncular space, compressing the second and third cranial nerves, but without greatly disturbing their function.

J. M. Clarke and R. G. P. Lansdown⁴ report a case of brain tumor removed by operation, with a subsequent operation for the **removal of a second tumor**, also ending successfully. The patient presented unmistakable symptoms of intracranial neoplasm, but without localizing symptoms, save a change in the percussion-note over an area

¹ Glasgow Med. Jour., June, 1901.

² Berlin. klin. Woch., No. 12 u. 13, 1901.

³ Boston M. and S. Jour., May 16, 1901.

⁴ Brit. Med. Jour., Apr. 13, 1901.

in the parietooccipital region of the skull. The application of the trephine at this point led directly to the location of the tumor, and a firm growth about $1\frac{3}{4}$ inches in diameter, distinctly encapsulated, was easily enucleated. Six weeks later signs of a second tumor in the same region appeared, and another operation resulted in the removal of a second larger tumor, so large that it had to be removed in two pieces, and weighed altogether $6\frac{1}{4}$ ounces. Hemiplegia resulted upon the second operation, but cleared up, and the mental condition became nearly normal. Sight, which was greatly impaired at the time of operation, did not correspondingly improve. [The great value of percussion in localizing a tumor is demonstrated beyond all question in this case. It appears that after a smaller tumor was removed, the larger growth, which was subjacent, was enabled to approach the surface, again giving local signs. The case presented a more decided optic neuritis with paresis of the external rectus muscle on the left side, the side on which the growth was located, a localizing feature not recognized by the operators.]

R. T. Williamson¹ reports an interesting case of tumor of the brain situated on the margin of the hemisphere at the **parietooccipital fissure**. In addition to the diffuse symptoms of tumor there were Jacksonian fits, commencing with convulsive movements in the opposite foot. Eyesight was lost, but before it was abolished there was no evidence of hemianopsia, although the tumor was not distant from the visual centers. The Jacksonian fit would indicate that the leg center extends further back than is usually supposed. An operation was done to relieve the intracranial pressure, but no attempt was made to remove the tumor, as its location was not considered definitely indicated. [The foot symptoms may be readily explained by the well-established rule of radiate explosive force. Arising at the point indicated, the foot center would be the first portion of the motor zone affected.]

Bayertal² reports a case of extirpation of brain tumor leading to entire recovery from **acute hallucinatory paranoia** which had supervened during the development of the tumor. The tumor was located in the paracentral lobe affecting the arm center. It was found to be a solitary tubercle about the size of a small walnut.

A. C. Gordinier³ reports an interesting case of **tumor of the superior worm of the cerebellum**. Clinically the case presented the symptom-complex insisted upon by Nothnagel as being diagnostic of tumors of the corpora quadrigemina. The autopsy demonstrated that the growth, while primarily in the cerebellum, was so located as eventually to involve these bodies and the adjoining tegumental region. He thinks that Nothnagel's statements are too dogmatic and that Bruns is nearer the truth in admitting that the distinction between growths in the corpora quadrigemina and the cerebellum is at times quite impossible. In favor of the quadrate bodies being primarily implicated is the appearance of the external bilateral asymmetric ophthalmoplegia,

¹ Brit. Med. Jour., July 6, 1901.

² Münch. med. Woch., 1899.

³ Jour. Nerv. and Ment. Dis., Oct., 1901.

often combined with internal ophthalmoplegia as a primary symptom, cerebellar ataxia appearing later. To these is often added bilateral deafness. In favor of the lesion being primarily cerebellar would be the early appearance of the staggering gait, especially when combined with paralysis of the abducens or facial nerves of one or both sides and followed by ophthalmoplegia of the above-described type.

Pituitary Tumor.—M. J. Babinski¹ reports the case of a girl of 17 who had been under observation for 10 years. She complained of head pains, which had appeared at the age of 14, increasing in intensity until they became very violent. For some months she had been subject to epileptiform crises and her vision had failed. Physically she showed decided tendency to obesity, but the conformation of the body in a general way was infantile and the genital organs had not developed nor had the patient menstruated. There were no local palsies and the reflexes were exaggerated, but there was no ankle clonus. Edema of the papillas on both sides was made out by the ophthalmoscope. At the autopsy a tumor was found occupying the sella turcica, adherent to the pituitary body and embracing the tuber cinereum. Under the microscope it proved to be an epithelioma developed from the epithelium of the pituitary gland. The ovaries and uterus were very small, having the dimensions of those of a girl of 8 or 10. Akromegaly and gigantism were not indicated in the conformation of the body.

Cerebral Hemorrhage Following Embolism.—M. Simmonds,² basing his belief on a case in which hemorrhage in the brain followed a verrucose endocarditis, thinks that embolism plays a greater part in the etiology of cerebral hemorrhage than has been usually believed.

Cerebellar Apoplexy.—Leonard Weber³ reports an interesting case of cerebellar apoplexy. The patient was a German of 29, who was suddenly seized with dizziness, headache, nausea, and vomiting, the last increasing whenever the patient raised his head. He was cold and clammy, but with a full, throbbing pulse of 70. There was no remission of symptoms for about 2 weeks, during which time there was no disturbance of the mind or of speech. At the end of that period, on taking him out of bed, he could just walk with his legs well apart, and the effort was attended by great discomfort. Later on the symptoms became intensified and finally he suddenly expired. On postmortem examination the right cerebellar hemisphere was more prominent than the left, and from a rent the blood had found its way over the medulla toward and into the fourth ventricle, where a fresh coagulum indicated the cause of death. This small rent in the cerebellum opened into a large cavity in the substance of the hemisphere filled with soft fresh coagulums and somewhat smaller ones of older date. The formation of a smooth wall around the cavity was distinctly noticed.

W. Thyne⁴ reports an interesting case of **cerebellar hemorrhage** presenting retraction of the head and Kernig's sign. The patient was a man of 20, with an epileptic history, who, after partaking of several

¹ Rev. Neurol., June 15, 1900.

² Deut. med. Woch., 1901, No. 22.

³ N. Y. Med. Jour., June 15, 1901.

⁴ Lancet, Feb. 9, 1901.

hearty meals on Christmas day, was seized with vomiting, which continued through the night. Six hours later the head was retracted, there was complaint of severe frontal headache, but no loss of consciousness, motor palsy, convulsions, twitching, or modifications of organic reflexes. The tendon-reflexes were increased. Kernig's sign was well marked. There was no ocular deviation. Lumbar puncture gave a negative result. Two weeks later the patient, who remained practically at a standstill, lost power in both legs, the right being first affected, and death occurred the next day. The dura mater was found thick, but healthy; there was a serous effusion in the subarachnoid space, very marked posteriorly. In the right occipital lobe there was coagulated blood extending down to the cerebellum. The lateral ventricles contained about 4 drams of clear serous fluid. The fourth ventricle had been inundated and contained a clot. There was a small hemorrhage in the left lateral cerebellar lobe. There was no hemorrhage at the base and no evidence of meningitis. The serous fluid was sterile. The order of events was probably as follows: Hemorrhage of the left lateral lobe of the cerebellum, finding its way to the fourth ventricle and thence through the foramen of Magendie to the subarachnoid space.

Intracranial Pressure after Head Injuries.—W. B. Cannon, in collaboration with W. N. Bullard,¹ in discussing the subject of intracranial pressure after head injuries, supports the contention that death from increase of brain-pressure is to be explained by the increase in osmotic pressure within the tissues, and is not due to passive transudation, as Bergmann and others have maintained, but the result of the active processes in the tissues themselves, a force many times greater than blood-pressure. The experiment to support this thesis is as follows: A brain is placed in a 2% solution of sodium chlorid. During the first 4 hours there is a diminution in weight because the osmotic pressure outside is greater than that inside the tissues. Slowly there is an increase in weight. The osmotic pressure is about 14.5 atmospheres. The pressure within the tissues must develop to this great height in order that the water should pass into them and produce the great increase in weight. Through this osmotic process the intracranial pressure results in cutting off the supply of blood, being many times greater than the blood-pressure. The osmotic process is set up indirectly by the traumatic force.

Cerebral Aneurysm.—H. H. Stoner² reports a very interesting case of cerebral aneurysm. A patient of 15 was suddenly seized, while at work in the field, with a violent headache, staggered and fell to the ground, then vomited several times. It was immediately noted that both pupils were dilated, the right more than the left, and this persisted for several days. There was ptosis of the right eye, myopia, and double vision lasting for 2 months. There was also aphasia, the patient being unable to read, write, or choose a word. This lasted about 3 weeks. There were no hemiplegia or convulsions at any time. Upon leaving the bed he walked with a staggering gait and complained of

¹ Boston M. and S. Jour., Aug. 8, 1901.

² Medicine, Oct., 1901.

weakness. Three months later there was slight recurrence. Later he complained of headaches, and cerebral vomiting set in. He died within the next 24 hours. Examination detected a firm blood-clot at the base of the brain, after being hardened; and upon section the third, fourth, and lateral ventricles were found filled with a clot. In the left side, just beneath the cortex in the ascending frontal convolution, a fusiform aneurysm of one of the terminal branches of the middle cerebral artery was found. Its diameter was about $\frac{1}{8}$ inch, length about $\frac{1}{2}$ inch. Immediately beneath the aneurysm was a cavity about an inch in diameter filled with necrotic brain-tissue and blood-clot. This cavity extended into the roof of the left lateral ventricle. A minute opening was found in the aneurysmal sac, through which the blood had escaped. The patient had suffered from an attack of endocarditis at the age of 4 years, and it is supposed that the aneurysm was the result of an embolus from the mitral valves of the heart.

MULTIPLE SCLEROSIS.

F. von Gebhardt¹ makes a careful study of the disturbance of sensation in 2 cases of multiple insular sclerosis, threshes out the literature of the subject, and reaches the conclusion that in every advanced case certain areas will be found presenting **permanently disturbed sensation**. In addition there are subjective and objective disorders of sensation and very often the association of hysteric sensory stigmas. The objective sensory disturbance may be in the direction of hyperesthesia or reduced sensitiveness. In the experience of the author it never reaches complete anesthesia.

W. G. Spiller² reports a case of **malaria presenting symptoms of disseminated sclerosis**. The presence of the estivoautumnal form of parasites in sections of the spinal cord proved the malarial origin of the disturbance, which clinically had shown itself as insular sclerosis. The condition presented irritative vascular lesions with the formation of multiple sclerotic foci. Only the vermis of the cerebellum seemed to be infiltrated by bacilli, the nature of which, however, was not clear. A review of the literature indicates that malaria is capable of producing insular sclerosis. Such instances may be divided, according to Torti and Angelini, into cases in which the symptoms are transitory and present only during the fever, cases in which the symptoms appear after the fever and are of varied duration, and cases in which the symptoms appear constantly without any fever. To these classes must now be added the variety in which the symptoms are attributable to the invasion of the malarial parasite with a permanent condition of motor disability.

Acute Internal Hydrocephalus.—Burr and McCarthy³ report the case of a man of 33 suddenly seized with fever, slow heart, spasm of the muscles of the back of the neck, stupor, and delirium. After 3

¹ Deut. Arch. f. klin. Med., Bd. LXVIII, No. 1 u. 2.

² Am. Jour. Med. Sci., Dec., 1900. ³ Jour. of Exper. Med., vol. v, No. 2.

weeks, during which the symptoms varied in intensity, he improved, but with symptoms of parietic dementia. After several recurrences of the acute symptoms the patient died. Kernig's sign was present throughout and the diagnosis was acute meningitis. Postmortem there was moderate internal hydrocephalus, chronic degenerative changes in the choroid plexuses, and acute inflammatory changes in the ependyma and subependymal tissues. The kidneys showed subacute parenchymatous nephritis. Experimentally similar lesions were produced by injecting certain toxic substances into the ventricles of kittens, but without increase in the ventricular fluid. The writers conclude that the fluid in this case contained some toxic substance, and from the condition of the kidneys it seemed to have a probable origin in the nephritis.

Meningoencephalocele.—Andrew Fullerton¹ reports the case of a little girl of 3 days presenting a round, opaque, fluctuating swelling in the occipital region, a little less in size than that of the child's head, which grew tense as the child cried. Operation was decided upon, and when the sac was opened the fenestrum in the occipital bone could be very distinctly defined. Within the tumor there was a mass of brain matter as large as a small hen egg. This, with its covering of arachnoid, was removed with scissors. Somewhat alarming symptoms developed and the wound was rapidly closed. The breathing for some time after the operation was of the Cheyne-Stokes type, but this passed off and the child made a fair recovery from the operation. The wound healed rapidly. The child perished from bronchitis a month later. The excised portion of brain was supposed to be part of the occipital lobe. [It is not clear why such a large mass of brain-tissue was removed, as by slightly enlarging the opening it might perhaps have been returned to the cranial cavity. The case is interesting as showing that even an encephalocele of immense proportions may be safely submitted to surgical intervention.]

Gas Cavities in the Brain.—F. von Reusz² reports a case in which a brain was riddled with cysts due to gas bubbles, which he believes is a condition generally, if not always, due to postmortem processes. In the instance in question those portions of the brain which were thoroughly infiltrated with the hardening fluid were not affected, but only the deeper portions showed the gaseous cysts.

Cerebral Excavation.—P. Marie³ contributes an article on the subject of **cerebral excavation** and the different forms of cavities found in the cerebral substance. He is of the novel opinion that hemiplegia in old people is more frequently due to cerebral excavation than to cerebral hemorrhage or softening, and feels that very little attention has been paid to the facts. Areas of excavation, according to this writer, are often in the form of little cavities with more or less irregular walls varying in size from a grain of millet to a large pea. Single cavities may be found or several, and they are usually located in the external segment of the lenticular nucleus, though they may be found

¹ Brit. Med. Jour., June 22, 1901. ² Pester med.-chir. Presse, XXXVII, No. 10.

³ Rev. de Méd., Apr., 1901.

also in the white substance of the brain, especially in the internal capsule or the corpus callosum and the centrum ovale. They favor the basal ganglia. A recent cavity looks like a patch of softening or a minute hemorrhage, and in the white substance the cavity is filled with granular bodies. In cases of long standing the granulation bodies disappear and round the cavity is a zone of sclerosed tissue. The cavities are often filled with vascular connective tissue. The convolutions in the neighborhood usually show atrophy and the ventricles are commonly dilated. In 23 of the 50 cases reported upon cerebral hemorrhage was also present. He states that the most usual symptom of the condition is hemiplegia, generally of sudden onset and with a tendency for the symptoms to recede. Other symptoms common to the hemiplegic state following hemorrhage and thrombosis are also present, but most patients are over 60 years of age. [Cavities of this size have been repeatedly noted by all who have examined brains of the aged, and commonly have been attributed to islands of thrombotic softening or similar pathologic process. The fact that the report quoted frequently finds cerebral hemorrhage or thrombosis leads to the belief that he has misinterpreted the facts in the case. Doubtless many of the cavities mentioned are artificial and of postmortem origin.]

Family Amaurotic Idiocy.—E. Frey¹ reports upon the pathologic findings in a case of this comparatively rare disorder. He does not agree with Sachs, who looks upon the condition as the result of cortical agenesis, but believes that the changes and conditions found are a postpartum degeneration, and contends that it is for early life what amyotrophic lateral sclerosis is in adults.

Huntingdon's Chorea.—Kattwinkel² reports the postmortem findings in a well-marked case of Huntingdon's disease. Two normal brains were treated in the same solutions at the same time to check the findings. The pia mater appeared to be thickened and was removed from the convolutions with difficulty. The convolutions, especially in the motor region, appeared narrow and the sulci deeper than usual. The ventricles were not dilated. Histologically the tangent fibers were apparently shrunken in the motor region, and the same condition to a less extent was present in the frontal region. Increase in neuroglia was not observed, but throughout the brain there were vascular changes of a degenerative character. In the spinal cord the vessels were normal and no degenerative tracts were observed. From the frequency with which leukocytes were found in the pericellular lymph-spaces the author believes that the disease is dependent upon a widespread effect inducing a compression of the ganglion-cells and secondarily inducing atrophy of the cortex. The series of changes goes back of the initial disorder of the vessels.

¹ Neurol. Centralbl., Sept. 16, 1901.

² Deut. Arch. f. klin. Med., Bd. LXVIII, No. 1 u. 2.

DISEASES OF THE SPINAL MENINGES AND SPINAL NERVES.

Lumbar Puncture.—V. P. Ossipow describes the **pathologic changes** which occur in the central nervous system of animals after lumbar puncture, and which go to show that the process is not so entirely devoid of danger and bad results as is ordinarily considered to be the case. He reverts, in literature, to a number of cases in which death followed this comparatively slight operation, within a few hours. Some 12 cases are quoted, occurring in the hands of competent surgeons, in which a fatal termination was induced by lumbar puncture. For instance, Lichtheim lost a case in which puncture was made in a cerebellar tumor. Fuerbringer reports 5 deaths after lumbar puncture, 3 of which were cases of brain tumor. A series of experiments was performed, the spinal canal of dogs being punctured and various amounts of fluid withdrawn. These clearly showed that the immediate result of removing cerebrospinal fluid is a hyperemia of the brain and spinal cord, especially pronounced in the neighborhood of the cervical and lumbar enlargements, the medulla oblongata, and the hemispheres. In 5 out of 8 cases in which the dog was sacrificed the day after the last lumbar puncture the hyperemia was still clearly manifest. These experiments would indicate that lumbar puncture produces a persistent hyperemia of the parts mentioned. The nerve cells in the cord and brain in some instances not only presented hyperemia, but actual extravasation of blood, a hemorrhagic condition. The author states positively that lumbar puncture is by no means so harmless an undertaking as at first sight it appeared to be, and believes that these experiments on dogs may be properly applied to human pathology. In sclerosis of the vessels and in aneurysm of the cerebral vessels he believes that lumbar puncture is absolutely contraindicated, also in acute and chronic diseases of the central nervous system which do not present clear and well-marked symptoms of encephalic pressure. Puncture in the cases of apoplectic hemorrhage presents the danger of drawing the blood into the ventricles, with fatal termination, as has in fact occurred. In brain tumor it has shown itself to be a dangerous procedure. In no instance should it be attended by aspiration, and he believes that lumbar puncture with aspiration of cerebrospinal fluid should be banished from surgical practice.

The Cervical Sympathetic.—P. Stewart² reports a very interesting case of gunshot injury affecting the right cervical sympathetic. The injury was followed by anidrosis of peculiar distribution. The nonsweating area was sharply defined by the middle line of the face, neck, and thorax as low as the third rib in front and the third dorsal spine behind, and spreading laterally included the whole upper extremity on the affected side as well as the same side of the head and face.

A. Chipault³ reports 39 cases of **resection of the sympathetic**, 22 for epilepsy, 3 for Graves' disease, 7 for glaucoma, 3 for facial neuralgia,

¹ Deut. Zeit. f. Nervenhe., Apr., 1901.

² Brit. Med. Jour., June 8, 1901.

³ Travaux de Neurol. Chir., 1901, No. 1.

1 for ophthalmic migraine, 1 for spasmodic torticollis, 1 for maniacal excitement, and 1 for facial hemiatrophy. In general he is pleased with the results, but the duration of time since the operation is insufficient to determine the exact value of the procedure.

Brachial Plexus Paralysis.—Huet, Duval, and Guillain,¹ under the title of “Traumatic Radicular Paralysis,” contend, both from histologic pathology and experiment, that paralyzes of the brachial plexuses are nearly always due to stretching of the roots either through downward or upward traction upon the extremity, as, for instance, when in falling the body is suspended by the hands, or by carrying heavy weights upon the shoulder, or by falling upon the shoulder, thereby stretching the plexus. Under these varied conditions the upper roots of the brachial plexus are principally involved, resulting in paralysis of the spinati muscles, the deltoid, and the anterior brachial group. The prognosis depends upon the persistence of disordered sensibility and the character of the traumatism itself, as well as upon the involvement of the anterior and posterior roots of the plexus. By their experiments upon the cadaver they proved to their own satisfaction that usually the rupture involved only the anterior roots of the fifth and sixth cervical nerves.

Radial Nerve Paralysis.—B. von Goncey² reports an interesting result of **surgical interference** to correct the deformity resulting upon radial palsy. All attempts to reunite the severed ends of the nerves having proved unavailing, it was therefore decided to transplant tendons in the hope of securing functional capacity. An incision was made below the styloid process of the ulna and the flexor carpi ulnaris dissected out and divided close to its attachment. Through an oblique incision starting through the junction of the lower and middle thirds of the forearm, this tendon was then drawn under the extensor carpi ulnaris and attached to the common extensor of the fingers at its branching. In 4 weeks the wounds were healed and under the use of massage the power of extending the fingers was completely regained. Subsequently he divided the flexor carpi radialis at the styloid process, drew it under the abductor of the thumb, and sutured it to the long extensor of the thumb. Six weeks later the patient was able not only to extend the thumb, but to carry out almost any maneuver with the left hand.

Meralgia.—J. Pal³ calls attention to the association of flatfoot with meralgia paræsthetica. In a number of cases examined and reported by him the plantar arch had yielded, the condition being an acquired one, and in one instance in which the meralgia was one-sided the flatfoot was on the same side. He believes that the two conditions are associated and that the meralgia is secondary to the flatfoot.

Sciatica.—Gibson⁴ has noticed in cases of sciatica a marked **exaggeration of the cremasteric reflex**, best elicited by firm pressure over the lower and inner portion of Scarpa's triangle. It may be associated with exaggeration of the knee-jerk and of the gluteal and

¹ Rev. de Neurol., Dec. 15, 1900.

² Pester med.-chir. Presse, Apr. 21, 1901.

³ Wien. med. Woch., 1901, No. 14.

⁴ Edin. Med. Jour., No. 9, 1901.

plantar reflexes, but never with Babinski's reflex, and the Achilles-tendon reflex is entirely wanting.

J. B. Roberts¹ reports an interesting case of **multiple tumors of the sciatic nerve**. An operation was undertaken to remove a large tumor which clearly was connected with the nerve in the popliteal space. The incision revealed many tumors involving the trunk and its internal and external popliteal branches; the whole length of the sciatic nerve from the sacrosciatic foramen downward was studded with tumors varying from $\frac{1}{8}$ inch to $1\frac{1}{2}$ inches in diameter. Both popliteal nerves were also involved. The operator removed about 36 of these tumors, though some had developed from the nerve-trunk separating the nerve-fibers and were fibrous in character, but many of them were wholly or in part of a gelatinous consistence. The wound healed by first intention. No numbness of the foot remained and the patient had good movement of the toes when discharged. Microscopically the tumors proved to be fibromas. Very little disturbance had been caused by their presence.

Palle² reports the **treatment** of a case of sciatica by the injection of a 2% aqueous solution of cocain into the dural sheath of the spinal cord in the fourth lumbar space. Local and general treatment had previously failed to affect the disorder favorably. The resulting anesthesia lasted 10 to 12 hours, the pain entirely disappeared and did not return, and the patient left the hospital some days later in apparent health. The exact dose is not indicated, the reporter stating that three-fourths of an ordinary hypodermic syringeful was given, with strict antiseptic precautions, in spite of which, however, there was fever of 3 or 4 days' duration and a patch of labial herpes.

Giordano³ reports a case of a patient with persistent sciatica cured by **section of the posterior nerve-roots**. Previous to operation many drugs had been tried and the sciatic nerve had been stretched after it had been exposed by incision. In the present operation the spinal cord was exposed through the posterior arches of the eleventh and twelfth dorsal and first lumbar vertebrae. The posterior nerve-roots were resected in the whole of the exposed area and pain ceased immediately, but on the second day neuralgia occurred in the course of the internal saphenous. As this persisted for a few days, the saphenous nerve was divided near the tibia. No recurrence of pain had occurred during 6 months, but the patient complained of a dead feeling and want of sensation in the leg.

Neuritis of the Anterior Crural in Childbed.—Meyer⁴ observed this condition in 17 out of 1000 patients in the Lying-in Hospital of Copenhagen. Pain in the thigh occurred about the third day, with distinct tenderness at the point where the nerve passes the brim of the pelvis. The pain radiates to all parts supplied by the nerve—to the hip, knee, and part of the foot. Thirteen of the 17 patients were primiparas. The children were not particularly large and there were no

¹ Phila. Med. Jour., Apr. 14, 1901.

² La Riforma Med., Feb. 22, 1901.

³ Gaz. degli Osped., Dec., 1900.

⁴ Centralbl. f. Gynäk., No. 25, 1901.

conditions of sepsis or other systemic state which would explain the neuritis.

Lesions of the Cauda.—W. von Bechterew¹ makes the point that the principal differentiating feature between lesions of the cauda and of the conus medullaris consists in the fact that conus lesions cause an anesthesia limited to the anoperineal region and that the sciatic field, so commonly affected in caudal lesions, does not participate.

Multiple Neuritis.—S. E. Henschen² reports a number of cases of multiple neuritis **due to phosphorus**, which, in addition to causing the well-known changes in the jaws, presented a disturbance of sensation and motion over the trunk and extremities, especially the upper limbs, showing a slight tendency to be confined to definite nerves or to present patches of sensory disturbance, suggestive of segmental cord relations.

J. S. Bury,³ in contributing a study upon **arsenical multiple neuritis** based upon his observations of an endemic resulting from the drinking of beer contaminated by arsenic, calls attention to the ordinary results of arsenical poisoning: (1) Certain skin-lesions, consisting of (*a*) pigmentation resembling Addison's disease; (*b*) herpes zoster in a small number of cases; (*c*) bulbous or erythematous eruptions and a thickened condition of the skin over the knuckles; (*d*) loss of the hair and nails. (2) Dysuria or glycosuria, intermittent in character. (3) Coryza and edema of the eyelids. (4) Ulceration of the gums and fauces. (5) The presence or history of acute attacks of indigestion associated with nausea, salivation, epigastric pain, and sometimes vomiting and diarrhea. No cardiac symptoms referable to the arsenical poisoning were noted. The mental condition is that usual in multiple neuritis of alcoholic origin, including a loss of memory for recent events and some confusion. Some of the differential features noticed in these epidemic cases, as compared with ordinary alcoholic neuritis, are more constant and more severe hyperesthesia in the skin and muscles, and erythromelalgia. A conspicuous feature is the frequency of well-marked ataxia.

Popoff⁴ contends that an **early electric investigation** may detect an oncoming multiple neuritis before paresthesia is developed. In some cases the interossei muscles of the hand do not contract to faradic stimulation and show diminished response to galvanism long before subjective symptoms were expressed. The author believes that these changes in electric response are extremely valuable diagnostic signs as the earliest indications of multiple neuritis.

Lauder Brunton⁵ calls particular attention to a **mask-like face** frequently seen in alcoholic multiple neuritis. He says the face is expressionless, the lips appear to move apart from the cheeks, but what is somewhat extraordinary, the lips themselves may seem very mobile. The eyebrows and eyes may move in accordance with the lips, but a

¹ Rev. de Psych. et de Neurol., No. 9, 1899.

² Neurol. Centralbl., June 15, 1900.

⁴ Neurol. Centralbl., 1900.

³ Brit. Med. Jour., Dec. 8, 1900.

⁵ Brit. Med. Jour., Dec. 1, 1900.

fixed and expressionless band stretches across the nose and cheeks between the eyes and lips, the skin upon the cheeks remaining motionless and unwrinkled while the lips, eyebrows, and forehead may be moving freely. He believes that the pupillary condition is also very significant, and finds it to be the **converse of the Argyll Robertson phenomenon**. In a number of cases he has noticed that the reflex to light is rapid and extensive, whereas the contraction of the pupils on accommodation for near objects is slight and sluggish or absent. In exceptional cases he has even noticed dilation of the pupil instead of contraction on accommodative effort for near objects.

Hamilton Wright¹ makes an important contribution to the subject of the condition of the **nervous apparatus in beri-beri**. He differs from most observers who have studied the disease, for in the clinical examination of 8 cases he found changes of the cells of the posterior spinal ganglia and the anterior horns associated with degenerated fibers, and also in the combined and hypoglossal nuclei of the bulb in those cases in which the corresponding nerves were affected. The lesions, he states, are scarcely distinguishable from those caused by alcoholic polyneuritis.

W. K. Hunter² contributes an admirable article upon the **condition of the motor ganglion-cells** of the cord in 5 cases of peripheral neuritis. All showed more or less marked changes, mainly of chromatolytic nature. In some instances there appeared to be a diminution in a number of ganglion-cells, but this appearance was not subject to absolute estimation. In 4 of the cases abundant yellow pigment was observed in the corneal cells, completely filling some of them and present in nearly every one, in at least half occupying half of the cell-plasma. The nature of this pigment is not deciphered by the author.

James Stewart³ reports a very interesting case of **puerperal polyneuritis** as it appeared clinically, but which upon postmortem examination was shown to be attended by disintegration in the spinal cord, of the nature of a poliomyelitis, and the peripheral nerves showed naked-eye changes. Under proper reagents inflammatory changes and degenerations were demonstrable. In the cord there was scattered degeneration in the position of the posterior columns involving both Goll's and Burdach's tracts in the lumbar region. In the cervical region the degeneration was confined to Burdach's column. Degeneration could also be seen in the cerebellar tract and in the upper dorsal and cervical regions. The posterior roots along the whole length of the cord presented degenerate fibers, Lissauer's column being particularly affected. No changes were discernible in the anterior roots. The ganglion-cells of gray matter, more especially in the anterior horns, and of Clark's columns under Nissl's stain revealed marked and advanced chromatolytic changes, even to complete atrophy and disappearance of cells in the cervical region. The spinal ganglion-cells showed no marked alterations, although there was a marked increase and prolifera-

¹ Brit. Med. Jour., June 29, 1901.

² Lancet, Aug. 25, 1900.

³ Phila. Med. Jour., May 4, 1901.

tion of the cells of the capsule surrounding the individual ganglionic cells. The clinical history made it probable that the case was originally neuritis and later localized myelitis. The symptoms for several months were those of neuritis rather than of a cord disorder, but later an ascending paralysis of the Landry type demonstrated the involvement of the cord. [The association of changes of the cord with multiple neuritis is so frequently found that it is impossible in many instances to state definitely the location of the primary disorder. There are those who think the presumption is established that the cornual cells are always involved dynamically or more seriously in every instance of peripheral neuritis.]

Jolles¹ reports a case of toxic symptoms apparently due to the **stannic chlorid** used in dyeing silk stockings, attended by more or less involvement of the peripheral nerves of the legs. A woman, aged 27, had attacks of partial paralysis of the legs, with anesthesia, a feeling of coldness, and ataxic gait. Whenever these symptoms were most marked the woman noticed that her feet were colored yellow, especially on the soles and sides. This color was derived from light yellow silk stockings. There was also increased perspiration. The symptoms continued for a year, the patient became emaciated, and the stomach dilated; there was marked ataxia and the patellar reflex was exaggerated. Chemic analysis of the stockings determined considerable quantities of tin. The urine contained large quantities of albumoses with a small amount of albumin. There were a few hyalin casts and tin was also detected in the urine. Three months later the patient could walk fairly well; the subjective sensations had disappeared. It was only after 2 months that tin could not be detected in the urine.

Multiple Fibromas of the Nerves.—R. B. Preble and L. Hektoen² report a most valuable case of multiple fibromas of the nerves. In the general consideration of the subject they note that a very large number of the cases are congenital, but not invariably so, as is contended by Bruns, since many examples are encountered in which the tumor has appeared a number of years after birth. This was true in the case recorded. In other cases in which no tumors are present at birth there are congenital pigment flecks and later tumors appear. Not only are such tumors frequently congenital, however, but tumors are often found in other members of the same family. In some instances when the tumors appear late in life certain authors attribute them to bad hygienic surroundings, overwork, cold, trauma, etc., acting upon a congenital predisposition, and a number of cases are cited to sustain this contention. The cases may be divided into four groups: (1) Tumors of the skin; (2) tumors of the nerves; (3) pigmentation of the skin; and (4) functional disturbances. A completely developed case shows symptoms of all four groups, but more commonly the symptomatology is incomplete, three, two, or only one group being represented. The groups most commonly absent are the pigmentations and functional disturbances. Skin tumors vary in number from one or two to many thousands. In the

¹ Wien. med. Presse, Mar. 17, 1901.

² Am. Jour. Med. Sci., Jan., 1901.

case reported there were many hundreds. They vary in size from a pinhead to an egg, and may be sessile or pedunculated. The skin covering them may be normal, but often is thin, relaxed, and thrown into fine irregular folds. Ordinarily the skin contains less than the normal amount of pigment, but may be deeply pigmented. The tumors are usually soft, but may be hard and dense, and commonly are neither tender nor painful, causing no disturbance, except mechanically from site and size. Other tumors of exactly the same nature are described under various names, as fibroma molluscum, elephantiasis, neuromatodes, Ranken neurom, in which the resulting tumors are very large and appear like irregular thick folds and laps of skin. The nerve tumors may occur without skin tumors, but as a rule when many nerves are involved there are also tumors of the skin; both sorts were present in the patient. The nerve tumors vary in size from those which cannot be palpated to that of a lemon. They are usually round, oval, or fusiform, not attached to surrounding parts, allowing side-to-side motion, but not in a longitudinal direction, owing to attachment to the nerve. Commonly there is more than one tumor on the nerve, and they may present an appearance like a string of beads. As a rule the tumors are firm, but in some cases are cystic. Usually they are not tender or painful, but may be so. A few nerves may be affected or many, and no nerve in the body necessarily escapes. The spinal, cranial, and sympathetic nerves are often involved. In many cases the involvement of the spinal and cranial nerves does not extend into the cranial cavity, but exceptions are noted. Pigmentation occurs in a variety of forms, colors, and arrangements. In many cases only a portion of skin covering the tumors is affected; in others the pigmentation appears in flat or slightly elevated areas of varying size, usually most numerous over the portions of skin covered by clothing; thus arms and legs commonly escape. The color of these areas varies from light brown to dark brown. Usually there are no hairs in the color plaques, but in some cases they are found, and hairy and vascular nevi are sometimes added to this list. The functional disturbances are decidedly slight in comparison with the apparent disabilities. The commonest symptom in this group is pain, which may be spontaneous or occur on pressure. It may be in the tumor or in the area supplied by the affected nerve. Actual disturbance of function is not common, but may be either sensory or motor in the nature of excitation or paralysis. Paresthesia, hyperesthesia, anesthesia, cramps, spasms, weakness, and paralysis are all found. Arthralgia is rarely encountered. Involvement of the vagus has caused dysphagia, hoarseness, dyspnea, palpitation, and tachycardia. Trophic disturbance is extremely exceptional, but the author's patient had an ulcer on the back of the thigh that presented the appearance of a perforating ulcer. Gangrene of the foot was also regarded of the same nature. In the patient examined there were numerous changes in joints which are regarded as secondary to nerve influence. Similar changes have been noted by other observers, but are exceptional. The course of the disease is slowly progressive, with danger in the severest cases only. In

certain instances the accidental location of the tumor, or sarcomatous degeneration of the tumor, leads to a fatal termination. The prognosis in the milder cases is good, but in the severer forms must be conservative.

DISEASES OF THE SPINAL CORD.

Amputation Changes in the Spinal Cord.—Switalski¹ reports the microscopic examination of 5 spinal cords from patients who had suffered amputations, 4 of the thigh and 1 below the knee. In every case there was atrophy of the half of the spinal cord corresponding to the site of amputation. Both white and gray substance participated in the shrinkage. In 3 cases the diminution of volume could be traced from the limb area to the dorsal region on the same side, and in 2 as high up as the cervical region. There was also sclerosis of the posterior column; in 3 cases, on all levels of the cord; in 2, only in the cervical region. The spinal atrophy showed a tendency to diminish from below upward, the sclerosis of the posterior columns to increase from below upward. P. Marie, in discussing the paper, insisted that sclerosis was commonly found in such instances and might exist even on the opposite side of the spinal cord, and was always most marked in the cervical region. An interesting and unusual instance is reported by J. O. W. Barratt,² the changes being traced through the encephalon.

Varicose Spinal Veins.—C. E. Coon³ reports an unusual post-mortem finding. A male patient of good habits and family history, with a syphilitic infection of several years' standing, for a number of years was troubled with chronic and obstinate constipation and large hemorrhoids. For 2 years he had had cystitis dependent upon a large prostate, and at various times pus-collections in the perineum discharged through the urethra, once through the scrotum, with a persistent sinus. The internal saphenous vein of the right thigh and leg was enormously dilated and very tortuous, presenting a tumor-like appearance. On the inner surface of the left knee the veins were also enlarged, but to a less extent. For 15 years he had excruciating pains in the lower extremities, which were described as "tearing, boring," coming without premonition and causing intense agony until the paroxysm passed. These pains were always much worse when he was tired or had been standing or walking. There were no surface indications to account for the disorder. He had had one attack of herpes zoster on the right side, and the pain associated with it he described as being quite like that in the lower extremities. He finally died of tuberculosis. The dorsolumbar cord at the junction of the dorsal and lumbar vertebrae presented a broad purple line visible through the dura, about 3 inches long and parallel with the cord. A portion of the posterior spinal vein was found to be very much dilated and filled with a dark blood. On the anterior surface of the cord, in the lower lumbar region and extending down to the cauda equina, two dilated veins were found, somewhat smaller than the

¹ Rev. Neurol., Jan. 15, 1901.

² Brain, 1901, summer number.

³ N. Y. Med. Jour., Mar. 17, 1900.

posterior one and communicating above with a single small anterior spinal vein. The author thinks that the posterior varicose condition accounted for the shooting pains in the lower extremity, and it is noteworthy that during the last months of the patient's life, while confined to bed, the pains were less frequent and severe.

Combined Degenerations of the Spinal Cord.—J. J. Putnam and E. W. Taylor¹ discuss the degenerative changes which take place in the posterolateral portion of the cord secondary to severe anemias, cachexias, and other conditions of physical deterioration. They note that out of 50 cases which correspond clinically to this variety of disease 7 were marked by profound anemia, presenting the blood-changes significant of the pernicious sorts. Five of these were males, while of the remaining 43 patients 31 were women, indicating that the female sex has a peculiar susceptibility to this form of neural degeneration. So far as age was concerned, more than half were 50 years old at the time of the onset. The oldest patient was 71 and the youngest 22. In addition to the anemias, various cachexias played an undoubted part, and in some there was a general feebleness and in a few small stature, lack of physical development, and other evidences of inherited or acquired vulnerability. A family history of neurotic tendency and nutritional weakness was commonly given. In the symptomatology paresthesia of one form or another is a strikingly important and prominent early symptom. The onset is as a rule insidious, though sudden invasion or a rapid increase in the condition was not unusual. Most of the cases showed a peculiar mental instability, sometimes largely an exaggeration of native traits. Atrophy of the optic nerve and epileptiform attacks have been noted. These, with the mental changes, as well as certain pathologic findings, indicate that the brain is also involved. The duration of the illness is variable; in 17 cases all perished within 5 years. Varieties of the disease are encountered in which the course is rapid; in others it is marked by remissions, and in others it is progressively continuous. A fatal outcome is the rule. In the early stages, in addition to the paresthesia, muscular weakness out of all proportion to the physical state is observed, and frequently there are increased reflexes. In the final stage the reflexes tend to disappear and the paraplegic state is one of relaxation. The authors make copious reference to the literature of the subject, and properly refer to the important communication made by Russell, Batten, and Collier, in "Brain," 1900. [Opinion is agreed that any seriously depressing systemic condition of long duration is capable of producing changes that are degenerative in character in the spinal cord and the general central nervous apparatus. Apparently they must be attributed to an autotoxic factor, which in some instances produces actual hemorrhages in the substance of the cord, in others leads to an irritant condition about the blood-vessels in the cord and brain, resulting in a more or less well-defined sclerotic condition. The principal changes are commonly confined to the posterior half of the cord, but no part of the

¹ Jour. Nerv. and Ment. Dis., Jan., 1901.

nervous apparatus is exempt. The clinical symptoms vary as the lateral or the posterior cord changes preponderate, giving spasticity on the one hand and ataxia on the other, but with muscular weakness and paresthesia as a rule in both. In short, it is the clinical condition described by Gowers as ataxic paraplegia and by Dana as progressive spastic ataxia.]

Tumor of the Spinal Cord.—M. A. Starr¹ reports 2 cases of tumor of the spinal cord in which operation was undertaken, in the first instance without much benefit, owing to the late period at which operation was done; in the second case, although the tumor was epitheliomatous, there was full recovery from all cord disability.

Tabes.—J. Donath² reaches the conclusion that syphilis is not the principal cause of tabes, and that in some cases it cannot even be considered as a predisposing factor. He notes that civilization furnishes an inclination to tabes, which seems to be lacking among primitive peoples. A hereditary tendency and **lack of nervous stability in the nervous system** the author believes to be essential elements in the development of the disease, or a similar instability may be acquired by overexercise and overstrains of various sorts.

S. S. Cohen and W. G. Spiller³ report a very interesting case of **cervical and bulbar tabes**, with necropsy. Such cases followed by careful autopsical investigation are rare, only half a dozen being found in the literature. As a clinical type, however, it is not so infrequent.

M. Behrend⁴ reports upon the **biceps tendon-jerk in locomotor ataxia**. Out of 29 cases of undoubted tabes the biceps tendon-jerk was present in 9 and the triceps tendon-jerk was present in 2 cases on both sides and on one side in 2 others. In the 2 cases in which the triceps tendon-jerk was present on both sides, the biceps tendon-jerk was absent on both sides in one and preserved in the other. From a study of the literature and of his own cases he concludes that: (1) ataxia in the arms is, as a rule, more marked when the biceps tendon-jerk is absent; (2) the ataxia of the arms is usually marked when the same is found in the legs; in these the biceps tendon-jerk is absent; (3) in the presence of the biceps tendon-jerk with slight ataxia in the arms, ataxia in the legs is invariably well marked; (4) sensation is usually normal in those cases with normal biceps tendon-jerk; (5) the sensory losses are usually found when the biceps tendon-jerk is absent; (6) arthropathies are only found in the advanced cases; (7) astereognosis is only present in the markedly ataxic; (8) the loss of the sense of position is almost constant in the advanced cases of tabes; (9) the shooting pains in the arms do not bear any relation to the degree of ataxia; (10) the marked ataxies seldom show the loss of weight sense; (11) intensity of the symptoms is not dependent on the duration of the case, but rather upon the extent of the sclerotic process.

C. Watson⁵ holds that **tabes is not a nervous disease** in the

¹ Jour. Nerv. and Ment. Dis., Mar., 1901.

² Zeit. f. klin. Med., 1900.

³ Am. Jour. Med. Sci., Aug., 1901.

⁴ Phila. Med. Jour., June 1, 1901.

⁵ Brit. Med. Jour., June 1, 1901.

sense usually apprehended, and that the lesions in and around the vessels are of primary importance, the lesions of the neuron being determined by local interference with blood-supply. He claims to have found similar changes in the spinal cord of a horse which presented ataxia and clumsiness in the use of its legs.

Negro,¹ after failing in a case of tabes to relieve **lightning pain** by antipyrin mixtures and phenacetin, gave 15 grains of santonin in 3 doses at intervals of 3 hours, and at other times gave a first dose of 10 grains followed in 3 hours by 5 grains. In each instance the crisis during which the drug was administered was relieved, usually at the end of 3 hours, and this in a number of cases. None of the patients had the treatment more than 4 or 5 times in the course of 2 or 3 months.

Syringomyelia.—Sokoloff² describes 8 cases of disease of the **joints in syringomyelia**, affecting the upper extremity in all instances. The progress of the disease was very slow; one case had shown symptoms for 20 years, another for 35 years. The onset is, as a rule, very gradual, and in one instance the initial condition was an acute intra-articular effusion. In general the condition resembles that of the arthropathies of tabes, the chief distinction being the localization of pain and the remarkable chronicity of the process. In the 8 cases 10 joints were affected, the elbow 5 times, the shoulder twice, the joints of the hand twice, and the external clavicular joint once. Ulnar fracture occurred twice. Contrary to the recommendations for the treatment of tabetic joints, Sokoloff advises surgical procedures in these cases without fear of accidents due to necrosis, etc. Schrader has also described 2 cases of **habitual dislocation of the shoulder** in syringomyelia. In both there were deformed and defective fingers on the affected side, and in both instances kyphotic and scoliotic conditions. This condition, shown by the skiagraph, was due to modifications of the joint surfaces, which presented great flattening of the humeral head and the glenoid fossa, in one, with elongation of the head and flattening of the glenoid fossa in the other.

Spina Bifida.—Lewis Marshall³ again draws attention to the importance of placing a child in such a position that as little fluid as possible is lost in operations for spina bifida, and states that in his opinion success depends upon the retention of the cerebrospinal fluid. During the operation and the after-treatment the buttocks of the patient are to be so raised and maintained for a week that gravity favors the proper pressure conditions within the cerebrospinal canal.

Herpes Zoster.—Henry Head and A. W. Campbell⁴ contribute a most valuable article on the subject of herpes zoster and its pathology. They first make a review of the cases of herpes zoster on record, which have been carefully examined histologically, and then of those in their own experience. They invariably find **changes in the posterior root ganglion**, which in acute stages constitute an extremely acute inflamma-

¹ Giorn. dell R. Accad. di Med. di Torino, Feb., 1901.

² Zeit. f. Chir., Bd. LI, S. 506.

³ Brit. Med. Jour., June 22, 1901.

⁴ Brain, Dec., 1900.

tion with slight exudation, extravasation of blood, destruction of ganglion-cells and fibers, and inflammation of the sheath of the ganglion. These are followed by an acute degeneration of a greater or less amount, or by secondary sclerosis, according to the severity of the primary destruction. In the peripheral nerves degeneration appears and disappears, to be replaced by sclerotic changes at the same periods after the initial lesion as the changes in the ganglion of the posterior roots. This change is secondary to the ganglionic lesion, as a rule, though an active inflammation may occur in the nerve and hemorrhage may extend from the region of the ganglion down into the nerve-trunk. The spinal cord also presents acute degenerations of the root fibers in the posterior column. This appears about the ninth or tenth day of the eruption of zoster. The changes are identical whether it be the fifth cranial nerve that is involved or the spinal nerves. Moreover, zoster due to implication of the posterior root ganglion in inflammatory processes secondary to malignant disease or injury is identical with that occurring spontaneously. They also note that diseases which are supposed to involve the posterior root ganglion, such as paralytic dementia and tabes dorsalis, are not rarely complicated with shingles. The changes in the skin and the cutaneous glands have been also carefully examined and the vesicles have been found to contain a serum absolutely sterile. The nerve twigs show marked degeneration. No evidence of bacterial invasion was found in the neighboring lymphatics, though they presented a condition of profound inflammation. The authors believe that herpes zoster is an acute specific disease of the nervous system which arises without any obvious peripheral or central cause, starts with a prodromal period of varying length, during which the temperature is raised and during which it is impossible to make a diagnosis. Suddenly the rash appears, and the disease is declared. The fever subsides, after lasting 3 to 5 days. It is also found that the disease tends to occur more at certain periods than at others, and has presented actual epidemics. The authors believe that the disease is the analogue of acute poliomyelitis, and they say it may justly be spoken of as acute posterior poliomyelitis. Of the nature of the agent which is responsible for the process there is no knowledge. This agent, whatever it be, not only shows a specific attraction for the posterior root ganglia, but commonly attacks one ganglion only. It is a curious fact that some ganglia are more prone to attack than others. Out of 392 cases the ganglia most commonly affected are those which received afferent impulses from the viscera through the sympathetic; namely, the third dorsal to the second lumbar and fifth cranial, which is in association with the mouth parts. The paper contains the clinical details of 20 cases completed by postmortem and histologic examination, with admirable plates displaying the pathologic anatomy of the disease, and an admirable bibliography. In connection with this subject the authors further discuss the segmental cutaneous areas of the body and extremities, drawing conclusions confirmatory of the former contentions of Henry Head.

C. Dopter¹ reports a small **epidemic of zoster** affecting 3 persons who occupied the same bedroom. In 2 of the patients the eruption was consecutive to the infectious state, and in the other followed gastro-intestinal troubles. In the third case the condition was the same, except the throat was also affected. The author believes that the intestinal infection was the real epidemic factor, the zoster being expressive of its action upon the nervous system. Numerous other epidemic attacks of zoster have been noted and are referred to in some detail by Wilbrand and Saenger² in the consideration of the pathology of ophthalmic herpes.

Progressive Atrophy.—K. Mendel³ reports a case of muscular atrophy showing clinically a combination of the influences ordinarily presented by the pure myopathies, but also with involvement of the small muscles of the hands, and other conditions associated with the symptom-complex of spinal progressive muscular atrophy. The case is another **connecting link between the various atrophies.**

Sachs and Brooks⁴ report a very interesting case of muscular dystrophy with autopsy and careful cytologic research. They found that the **posterior root ganglia universally showed a shrinkage of the ganglion-cells**, in many cases similar to that produced by fixing agents, but the perilymphatic spaces inclosing the shrunken cells were uniformly filled with proliferating cells, indicating that shrinkage had taken place long before death and that it was decidedly a pathologic process. Degenerative tracts were absent in every part of the cord. Complete absence of changes in the smooth muscles were also noted, the atrophy being strictly localized to the voluntary muscles. The muscles of the heart showed no variation although there was moderate interstitial increase in this organ. The authors believe that the changes found in the posterior root ganglia are of decided significance and bear a direct relation to the atrophy of the voluntary muscles, but that this relation is practically secondary, the muscle change in all probability being the initial step.

NEUROSES DUE TO INFECTION.

Tetanus.—Krokiewicz⁵ reports 2 cases of tetanus treated by hypodermic **injections of brain emulsion.** The first, a man of 33, received a cut making an autopsy on an exhumed body. Twenty hours later tetanic symptoms appeared in the right arm. On the eleventh day general tetanic spasms set in and death was imminent. He was treated by morphin hypodermically, potassium iodid and bromid by the mouth, and inhalations of ether. A severe tetanic spasm lasted 3½ hours. An hour and a half after this an unfiltered emulsion of the brain of a rabbit was injected hypodermically and this procedure was repeated on the second and fourth days. There was no repetition of the tetanic convul-

¹ Rev. de Méd., May 10, 1901.

² Die Neurologie des Auges, Wiesbaden, 1901.

³ Neurol. Centrall., July 1, 1901.

⁴ Am. Jour. Med. Sci., July, 1901.

⁵ Wien. klin. Woch., 1900.

sion after the first injection and the temperature and respirations fell to a normal level. A third injection produced an aseptic abscess, which required incision. Chloral hydrate, sulphonal, potassium iodid and bromid, strophanthus, caffein, digitalis, and valerian were also prescribed for various symptoms. The second case was in a woman of 35, who 6 days after getting a splinter into the right thumb developed trismus. Shortly afterward spasms involving the muscles of the whole body occurred. On the tenth day, after the usual treatment, an emulsion of one rabbit's brain was injected under the skin of the thorax. The next day convulsions were frequent, but not so severe, and swallowing was possible for the first time and speech became distinct. On the twelfth day there was further improvement. The patient was visited by some Jewish relatives on this day, who compelled her, from religious motives, to get up and walk for about 30 minutes. Early the next morning death occurred suddenly. This method was first practised by Krokiewicz in 1898 after Wassermann and Tokaki had experimented on animals. Since then 10 cases are reported, with 8 recoveries, and in both the fatal instances there was temporary improvement.

Sydney H. Long¹ reports a case of **acute tetanus successfully treated with antitetanus serum**. A lad of 13 scratched his toe on the nails in an old shoe; the next day the toe was inflamed and was poulticed. The fourth day after the injury symptoms of tetanus were noticed. Four days later 10 cc. of antitetanic serum was injected subcutaneously, the injection causing a generalized spasm, on account of which succeeding injections were made under chloroform. Similar doses were given every 4 hours for 2 days; after this the injections were continued 6 days more and were given by the rectum, and then given every 8 hours for 3 days longer. In all, 13 injections were given hypodermically and 55 by the rectum, making a total of 680 cc. of serum. The maximum number of daily spasms occurred on the fourth day after the serum treatment was commenced; thereafter they gradually declined to the zero point, 5 days later. [The case, in view of the early infection and severe character, with 7 days of progress before antitoxin was used, is valuable in estimating the worth of the serum treatment. Under ordinary management it might have reasonably been expected to terminate fatally.]

Wilms² reports very poor results by the **antitoxin treatment**, and caustically criticizes the reports which have appeared in regard to this method during the recent months. He emphasizes the fact that the treatment must be begun early to be of any value whatever, and, if possible, within the first 30 hours after the disease has declared itself. He has used antitoxin in enormous doses. Of Behring's preparation 100 units should be injected, he says, at a time. He has found that even with repeated doses of this size acute tetanus does not seem to be checked by it. In one instance in which the disease was not declared until 9 days after the injury, within 30 hours the patient received 4,000,000 units of Tizzoni's serum, and on the second, third, fourth,

¹ Brit. Med. Jour., Nov. 24, 1900.

² Münch. med. Woch., Feb. 15, 1901.

and fifth days a million units per day. Death occurred on the sixth day, no improvement having followed any of these injections, although the case from the lateness of its development might have been expected to have been favorably modified or to have spontaneously recovered.

J. Tsuzuki¹ has studied the conditions necessary for the successful **treatment of tetanus by antitoxin**, and concludes that the most important facts relative to clinical treatment are: (1) That the antitoxin should be injected as early as possible; (2) that the greatest number of antitoxin units available should be employed; (3) that antitoxin should be injected at the site of injury so as to act on the infected cells; (4) that the less the dose of toxins absorbed, the greater the chance of cure by antitoxin. To the same end he suggests that a successful antitoxin is one with a short incubation period, and thinks Tizzoni's antitoxin is six times less powerful than Behring's. He also has noted that if some indifferent fluid be injected hypodermically together with, or immediately after, the injection of the antitoxin, the resulting disease runs a milder course than in cheek animals in which no indifferent fluids have been injected; but injections at a remote portion of the body, or some time after the antitoxin injection, produce no similar effect. At least 1 unit of Behring's tetanus antitoxin No. 60 should be injected for every kilogram of body-weight, and not later than 6 hours after the onset of tetanus. Within these conditions he believes that the antitoxin treatment has a very decided value.

Chorea.—Lannois² has used **sodium cacodylate** in the treatment of chorea. He gave it subcutaneously in doses of $\frac{2}{100}$ to $\frac{4}{100}$ of a gram per day and continued it usually for 5 days, then after an interval of 4 or 5 days it was repeated. Three days' treatment sufficed to cure an intense chorea in a girl of 15. Another patient was cured in 15 days. In a case of long standing marked amelioration was caused by 8 injections. In a severe case of choreic insanity a fortnight's treatment caused distinct improvement of physical and mental symptoms. In all these cases ordinary treatment had previously been without benefit.

W. Gordon³ again calls attention to a **peculiarity of the knee-jerk in some cases of chorea**. Apparently he is not familiar with communications on this subject that have appeared in America and elsewhere and only recalls a statement by Russell, who says: "In some cases the resulting traction of the quadriceps extensor is unduly sustained when the knee-jerk is elicited." Gordon finds that by placing the patient on the back, the knee being semiflexed, a tap on the patellar tendon causes the foot to rise from the bed when, instead of dropping back promptly, as is normally the case, it is, to use his expression, "hung up momentarily or drops partly and then is hung up." This is not always present, but sometimes appears in cases which are not markedly choreic as far as motor manifestations are concerned, furnishing a diagnostic symptom of some value.

¹ Arch. Internat. de Pharm. et de Therap., vol. VIII. Nos. 1 and 2, 1901.

² Lyon Méd., Jan. 27, 1901.

³ Brit. Med. Jour., Mar. 30, 1901.

H. Bischoff¹ reports a case of **senile chorea**, and tabulates 61 cases from the literature. The author concludes that senile chorea is a rare disorder; that men and women are equally affected; that rheumatism and heart-disease are rare complications, heart affections being found in about 12% only; that in 60% the mental condition is normal; that the right and left sides are affected with equal frequency; that in 20% of cases the patients recover, the longest duration in recovered patients being 1 year. In the case reported by the author a hemiplegic condition of rather rapid onset and not attended by stroke features suggested the probability of an arterial lesion, but at the necropsy nothing of the sort was found. Senile arterial changes, however, were everywhere present, and probably were sufficient to interfere with the circulation of the brain. [It at least seems evident that senile chorea as here described has little or no relation to Sydenham's disease.]

PSYCHONEUROSES.

Epilepsy.—J. W. White² contributes an article on the **topical treatment of Jacksonian epilepsy**. After considering the ordinary results of operative interference the author was led to attempt the injection of a solution of eucain into the substance of the brain at the point indicated by the character of the fit. The defective center having been determined, the scalp is raised in a horseshoe flap and a half-inch button of bone removed by trephine. The dura is not invaded. Thirty minims of a sterile 2% solution of eucain is then injected into the brain substance at the center of the trephine opening, the point of the needle being introduced about $\frac{3}{4}$ inch and the needle withdrawn as the last of the substance is injected. The flap is replaced and the patient returned to bed to receive full doses of bromids. At subsequent intervals, under careful antiseptic precautions, the eucain injections are repeated through the scalp and bone opening. Two cases are published. In the first instance the patient at the age of 6 months had infantile cerebral palsy, affecting the right arm and right leg. After the operation and injection he claimed to have recovered some motion in the hand and arm, which he stated he did not have previously. The first injection was made March 11th. On the 12th an epileptic convulsion occurred, and between March 12th and June 24th he received 5 intracerebral injections, the quantity varying from 10 to 15 minims, the eucain being increased first to 4% and then to 6%. During this period of 14 weeks he had 8 convulsive attacks, all, with one exception, being milder than those preceding the treatment. October 10th of the same year he was readmitted, having had 4 attacks since June 24th, less severe in character and not accompanied by the pain which formerly had marked them. On the 18th the injection was repeated, followed by a series of very slight convulsions during the next 5 days. November 1st, 10th, 18th, and December 1st the injec-

¹ Deut. Arch. f. klin. Med., No. 3-4, Bd. LXIX.

² Phila. Med. Jour., June 15. 1901.

tions were repeated. During this period 3 slight convulsions took place. January 20th of the next year 15 minims of a 4% solution was again injected, one convulsion having taken place in the interval. On June 12th, there having been no attacks for 14 weeks, he received 20 minims. On October 6th this was again repeated, the patient having had one slight convulsion in the interval. It was also repeated December 1st. Threatenings of attacks appeared, but they were controlled by the use of an emetic. In the second case, after the injection of 30 minims of 2% eucaïn the patient complained of nausea and numbness in the right arm and leg, and a little later had a convulsive seizure which involved the whole right side with the exception of the face. The result in the case is not known, as the patient shortly disappeared.

J. J. Putnam¹ maintains that in Jacksonian epilepsy **operations of many different sorts are of value**; that the beneficial action of these operations, although complex in character, is mainly due to the introduction of temporary inhibition of the morbid action of the cortex.

Tedeschi² has investigated the relation of superficial and deep **reflexes in epileptics**. In general terms the author claims that when the pyramidal tracts are injured the tendon-reflexes are exaggerated, with usually a weakening or abolition of the cutaneous responses. In certain varieties of chorea and in epileptics, especially after the fit, there is antagonism between the superficial and deep reflexes.

C. Ceni,³ in making a study of the **temperature in epileptics** at different periods of the day, noted that a considerable lowering of the temperature might occur at any period of the day or night amounting to several degrees, and this may last from 30 to 60 minutes. He detected this in 12 out of 20 cases. It appeared to be an epileptic equivalent, in some instances occurring 3 or 4 times in one day, but usually several days intervened. Occasionally it was periodic, in other instances very irregular in its appearance, and the hypothermia had no apparent relation in point of time to the epileptic attacks and the ordinary course of the disease. Sometimes it preceded a convulsion by an hour or two. The author draws the conclusion that this hypothermia is another strong argument for the toxic theory of the disease, and finds that a lower temperature has been induced in animals by the injection of epileptic blood.

L. P. Clark,⁴ in a consideration of the modern treatment of epilepsy, contends, in relation to **trephining**, that idiopathic epileptics with typical seizures should never be trephined; that idiopathic cases presenting the Jacksonian type of fits can be trephined only when infantile palsies can be excluded and when the family and personal degeneracy is but slight. These cases require the very thorough removal of the epileptogenic area, and even then recovery is exceptional. In epilepsy due to traumatism, when the injury is definitely proved, and stands in direct relation, trephining may be done if the disease has not lasted more

¹ Phila. Med. Jour., June 15, 1901.

² La Riforma Med., May, 1901.

³ Centralbl. f. Nervenh. u. Psychiatrie, Oct., 1900.

⁴ Med. Rec., Jan. 12, 1901.

than 2 years. The prognosis even then is very uncertain and must take into consideration the neurotic predisposition, which furnishes a tendency to the prolongation of the disease. The sooner trephining is done in these cases, the better. In relation to medicinal treatment nothing is of any particular value except the bromids, but these must be carefully combined with dietetic, occupational, and hygienic management. He finds that large daily doses must be used to suppress the convulsions and employs from 300 to 500 grains if necessary. The level necessary to control the convulsions is gradually reached and then maintained. Hot and cold baths, clonic flushing, antiseptics of the alimentary canal, and massage he considers absolutely essential to successful bromid treatment. Sometimes he finds bromin a worthy substitute when bromids cannot be tolerated. He also thinks salt starvation¹ or semi-salt starvation a valuable adjuvant to the bromid treatment, which should always be tried before bromids are discarded.

G. Mirto² reports a number of experiments relative to the **temperature of the brain** of an epileptic. On one occasion the needle of the galvanometer indicated an increase of 2° C. of temperature and then a prompt return to the normal. During this interval the patient had an attack of petit mal. The author draws the conclusion from his observations that during the epileptic attacks considerable transformation of chemie energy into heat occurs in the brain.

J. J. Putnam³ states that in **hysteric contracture of the hip-joint** there is an absolute increase in the measurement from the anterior superior spine of the ilium to the internal malleolus, which would serve to differentiate it from hip-joint disease, and has served as such differentiation in a number of cases.

L. E. Bregman⁴ reports a case of **fecal vomiting in hysteria**, and collects about a dozen cases from the literature. In the majority the condition was associated with spasm of the intestine and in numerous instances was at some period of the clinical history attended by intestinal hemorrhages.

J. K. A. W. Salomonson⁵ reports 2 cases of **hysteric scoliosis**, the condition proved by the sequel. Both presented a list of hysteric stigmas, both somatic and mental. In both there finally occurred a hysteric accident in the form of contracture of the hip-joint. This was attended by deviation of the spine, which had received the major attention, while, in fact, it was merely secondary to the position of the hip. It is not unlikely, as the author points out, that many of the cases of so-called hysteric scoliosis are dependent upon the condition of the hip-joint—are, in short, secondary to hysteric contracture at that point.

Aposti⁶ has given **methylen-blue** in several cases of hysteria with alleged beneficial effect, partly attributable, the author thinks, to suggestion. Marimo is quoted as having obtained identical results in sev-

¹ Burr, YEAR-BOOK, 1901, article Epilepsy.

² Annali di Neurologia, 1899.

³ Jour. Am. Med. Assoc., May 4, 1901.

⁴ Neurol. Centralbl., Oct., 1901.

⁵ Deut. Zeit. f. Nervenhe., Dec., 1900.

⁶ Riv. Crit. di Clin. Med., Nov. 24, 1900.

eral cases. In addition to the suggestion, which is enforced by the blue color of the urine, possibly an antiseptic effect upon the digestive system may be of some value in producing the beneficial results.

F. S. Pearce,¹ in discussing **climatology for neurasthenia**, says there are two extremes to be avoided by the neurasthenic invalid: first, a low, windy, treeless country; and, second, high altitudes with low atmospheric pressure especially if marked by a constantly cloudy atmosphere. Localities where heavy storms prevail are to be avoided, and districts menaced by high winds and frequent fogs, as well as low country with continuous, nonvarying, moderate heat. A sea voyage is usually an excellent preliminary to other climatic measures. As desirable the author considers the Maine country about the Rangeley Lakes, with an altitude of 600 to 1000 feet, with a well-laden pine atmosphere and plenty of sunshine. Next in order in America he places the inland country of New Brunswick and Nova Scotia, the gravelly and stony sections of the United States and Canada, the Great Lake regions of Ontario, Wisconsin, Michigan, and northwest into Canada.

J. A. Feinberg² reports a case of **asthenic bulbar paralysis** in which there was fecal retention, and he believes that the asthenic symptoms had a direct relation to the autointoxication arising from the intestinal state. At the height of the stercoral occlusion of the large bowel the bulbar paralysis developed, and the asthenic symptoms retreated with the improvement in the intestinal condition.

Laquer and Weigert,³ in a contribution upon the subject of **myasthenia gravis**, report a case in which they found the central nervous system entirely normal. There was, however, disease of the thymus gland, and the muscular system was widely infiltrated with metastatic cellular tumors, which they designate thymus tumors. They claim that in many of these instances the disease may be located in the muscles, and urge a careful investigation of the muscular apparatus. They also lay stress upon the combination of myasthenia gravis with disease of the thymus gland.

Migraine.—Walter Whitehead⁴ claims that for 25 years he has never failed to treat successfully the most inveterate cases of migraine by the introduction of an ordinary tape **seton** through the skin at the back of the neck. The seton is introduced under nitrous oxid and is to be worn uninterruptedly for 3 months, at least. Should the symptoms return, a second seton may be introduced for a shorter period of time.

THE TROPHONEUROSES.

Exophthalmic Goiter.—Dupré and Grillaïn⁵ report a case of exophthalmic goiter **with scleroderma and tetany**. They were able to collect 12 cases in which scleroderma and Graves' disease were asso-

¹ Penna. Med. Jour., Apr., 1900.

² Neurol. Centralbl., Feb., 1900.

³ Neurol. Centralbl., July 1, 1901.

⁴ Brit. Med. Jour., Feb. 9, 1901.

⁵ Bull. et Mém. de la Soc. Méd. des Hôp. de Paris, May, 1900.

ciated, but the further association of these two with tetany is absolutely exceptional, although the participation of thyroid disturbance in all three affections is undoubted.

R. Abrahams¹ presents 3 cases of exophthalmic goiter in women, **secondary to syphilis**, all symptoms of both syphilis and exophthalmic goiter disappearing upon the institution of vigorous specific treatment, although orthodox remedies and treatment had been unavailing.

Walter Edmunds² contends that this disease is due more to the involvement of the **parathyroids** than to disturbance of the thyroid gland itself. His conclusion is drawn from the experimentally proved fact that acute nervous symptoms may be produced by the excision of the parathyroids alone. The mode of action upon the nervous system, according to Edmunds, is supposed to be a deprivation of certain secretions which are necessary to the maintenance of the Nissl bodies in the blood, and which are supposed to constitute a necessary food for the cells.

Graves' Disease.—Kedzior and Zanietowski³ found postmortem, in a well-marked case of Graves' disease, the usual hypertrophy of the thymus gland, dilation and hypertrophy of the heart, ovarian cyst, atresia of the oviduct, and, in the brain, traces of old and recent hemorrhages which were also present in the cord and in the olivary body. The principal point was that the left **corpus restiformis** was decidedly less in size than the right, and they believe this has a relation to the pathology of the disease.

Scleroderma.—Bettmann⁴ reports a number of cases of scleroderma accompanied by a **factitious urticaria**. He reports 2 cases in which generalized scleroderma was progressing. In both, dermographia or factitious urticaria could be produced over the chest and back where the scleroderma had not apparently made the slightest invasion. After irritating the skin the lesions of urticaria took several minutes to appear, but lasted on several occasions 5 or 6 days. Electric treatments induced urticaria at the points where the cathode had been placed, remaining for 24 hours or longer; or sometimes a patch of goose-skin would be developed in place of the urticaria. Other vasomotor phenomena were observed in the same patients, such as occasional attacks of local cyanosis, local syncope, hard swellings of a few hours' duration appearing without cause on the feet, temporary, irregular, painful, red patches on the soles of the feet. Heretofore the longest duration of factitious urticaria is the reported case of Cornu—48 hours.

Hereditary Chronic Trophoedema.—M. Lamois⁵ reports 4 cases of this rare disorder (see YEAR-BOOK, 1901) occurring in a mother, two sisters, and a child of one of the sisters. As in the cases reported by Milroy, Meige, Higier, and Desnos, the edema caused no inconvenience aside from the clumsiness of the members. It was resilient, painless, and confined to one or both lower extremities. No electric changes were presented by nerves or muscles.

¹ Phila. Med. Jour., Feb. 9, 1901.

² Brit. Med. Jour., Sept. 1, 1901.

³ Neurol. Centralbl., May 16, 1901.

⁴ Berlin. klin. Woch., Apr. 8, 1901.

⁵ Nouvelle Icon. de la Salpêtr., No. 6, 1900.

Pulmonary Osteoarthropathy.—E. F. Buzzard¹ reports the post-mortem findings in a case of this disease, which had been previously reported as a typical instance. The finger, which was the site of the usual deformity, was amputated and the terminal joints were decalcified. Sections showed no appreciable lesion in bones or joints, but there was an **excess of the subcutaneous fat** of the end of the finger, accounting for its bulbous shape. There was no periosteal thickening nor arthritic lesions of any variety. Careful examination of the spinal cord and peripheral nerves was also entirely negative.

Raynaud's Disease.—T. K. Monroe,² in a little book entitled "Raynaud's Disease," reviews the history and bibliography of Raynaud's disease. He finds in the etiology of the disease that about two-thirds of those affected are females, and that the average age of onset is about 29 years for both sexes. In nearly 8% of cases there is direct heredity or the presence of Raynaud's phenomena in antecedent or collateral members of the family. Occupation bears relation to the disease in proportion as it entails exposure to cold; and season has a similar relationship. Mental strain and violent emotion are occasional causes, chiefly in women; and malarial fever has a close etiologic relationship in many instances. The Raynaud disease may be contemporaneous with the attack of fever, slightly precede the shivering or coincide with the shivering or the sweating, or may replace or alternate with the fever, itself being apyretic. During the condition of local asphyxia Riva has shown that voluntary muscular power and muscular response to faradization may be impaired. The gangrene that occasionally results is always of the dry variety. The process is one of mummification. The gangrenous condition also is not generally symmetric, as it may be very severe and extensive on one side and insignificant on the other. In some cases gangrene seems to be primary; in other instances the patients suffer for years from paroxysms of local syncope and asphyxia before gangrene occurs. In course of time small blisters appear, or ulceration takes place, or the tissues become gangrenous. In a third type necrosis is brought about gradually. The tissues are in a state of asphyxia throughout the year. At various points small blebs or ulcers appear, after a time giving way to cicatrices. Raynaud's disease has been noted in association with typhus, enteric fever, smallpox, influenza, syphilis, tuberculosis, malarial fever, rheumatism, anemias, hemorrhages, disorders of the digestive system, and numerous other morbid states. In 180 cases hemoglobinuria was noted 11 times. About one-fourth of all patients suffering from Raynaud's disease have presented other phenomena related to disorder of the nervous system. Convulsions, insanity, hereditary chorea, headaches, akromegaly, aphasias, vertigos, paresis, peripheral neuritis, and various cerebral symptoms have been noted. Raynaud's disease is often associated with scleroderma; and a tendency to scleroderma was manifest in 13 of the 180 cases collected by the author. In local syncope there is undoubtedly contraction of the arterioles; and in

¹ Brit. Med. Jour., June 1, 1901.

² Glasgow, 1899.

certain cases diminution in the pulse of the larger arteries, as the radial, is evident. The manifestations are necessarily brought about through the agency of the nervous system, as is evidenced by the widespread distribution of the symptoms and frequent association with other neuroses, the readiness with which they respond to emotional conditions, and the frequency with which they depend upon causes acting upon the nervous system in particular. There are three factors to be recognized: overexcitability of the vasomotor centers, stimulation of these centers by poisons in the blood, and stimulation of these centers reflexly by agents acting on the periphery. It is not necessary to suppose that a peripheral neuritis is present, as the disorder may occur without neuritis and apparently without either arterial disease or neuritis. In many cases Raynaud's phenomena appear to be the external manifestation of a morbid blood state, the prejudicial agent being a toxin produced in the specific febrile process, such as typhus, enteric fever, diphtheria, etc., or the products absorbed from suppurating foci in the lungs, or in association with lead-poisoning and lithemic conditions generally, as well as those conditions which give rise to uremia. The diagnosis presents little difficulty when the three stages of local syncope, asphyxia, and gangrene are presented. But these may not be all manifest. The paroxysmal element, recurrence of the attack, is essential to a diagnosis. Bilateral symmetry is very important, but not essential. The diagnosis of Raynaud's disease is opposed, but not excluded, by advanced years on the part of the patient. The treatment consists in general measures directed to the health of the individual, the avoidance of undue exposure, and a diet of suitable selection. As to drugs, opium has some value. Cannabis indica and analgesics of the phenacetin group, for the relief of pain, are serviceable. Nitrite of amyl does not give the relief that might be expected. Nitroglycerin is equally valueless in some cases, but often may furnish immediate temporary relief. Thyroid extract has been approved by one or two. Electricity seems to be the best local measure. The use of galvanism in currents of small volume and low electromotor force, passed through the parts immersed in a warm saline solution, for a half-hour once or twice daily, is decidedly beneficial.

The Pituitary Body.—Friedmann and Maas¹ succeeded in removing the hypophysis cerebri in cats by an operation through the base of the skull. They avoided effusion of blood and cerebral pressure, though some of the animals died from septic complications. Their results enabled them to conclude that the pituitary body is not an organ necessary to life. No changes resulted in other organs owing to the removal of the pituitary body. The thyroid gland remained unaffected. Albuminuria was not noticed; sugar, however, was detected in the urine several times a few days after the operation, but disappeared. The authors propose to undertake a series of experiments in which irritation of the pituitary body will be induced to produce conditions somewhat analogous to those found in these bodies in akromegaly.

¹ Berlin. med. Woch., No. 52, 1900.

MOTOR NEUROSES.

Paralysis Agitans.—J. M. Taylor¹ contributes a valuable article on the **treatment** of paralysis agitans by **exercises and massage**, which have the initial purpose of limbering up the rigidities and then increasing muscular strength and activity. The description of the method is not adequate to a full comprehension of the plan pursued, but the general character of the treatment is indicated. The same or similar exercises have been found beneficial in a number of conditions marked by tremor. An important part of the treatment is the attainment of normal attitudes. This is particularly true in Parkinson's disease. The difficulty encountered here is the apathy of the individual and his mental and physical inertia.

J. P. Karplus² makes a study in Parkinson's disease of the **general sensibility**, which ordinarily is considered intact. He finds that the cutaneous sensibility is often disturbed in the extremities and portions of the body affected by the tremor. In no instance was such disturbance found without accompanying tremor, and it usually consists of hyperalgesia. In 35% of 103 cases observed in Kraft-Ebing's clinic subjective sensory disturbance was noted. The author's conclusions are that sensory disturbances are not constant and that the motor symptoms are still to be regarded as the characteristic and prevailing feature.

D. Frank³ calls attention to a number of **unusual symptoms** in paralysis agitans, but particularly to a false foot-tremor elicited by the usual test for foot clonus. After the foot is held for a few moments in dorsal flexion a typical tremor ensues, differing from the ordinary clonus in that the movements are slower, less rhythmic, and apparently produced by the extensor muscles. It has been elicited several times in cases of Parkinson's disease that did not show tremor even in the upper extremities.

P. F. Schwenn⁴ attaches importance to certain **changes found in the muscles**. A patient, who presented the characteristic symptoms of paralysis agitans, died at the age of 43. Postmortem examination failed to show macroscopic or microscopic lesions of the nervous apparatus, but a histologic study of the muscles from various parts of the body determined a considerable increase in the longitudinal connective-tissue nuclei, and the author is disposed to think that the change is responsible for the symptoms of the disease.

Paramyoclonus Multiplex.—Murri⁵ regards paramyoclonus multiplex as a symptom-complex resulting from various causes and not necessarily hysteric. He reports two cases with no evidence of hysteria. Postmortem, in one instance, a chronic localized pachymeningitis with atrophy of the gray substance of the central convolutions was

¹ Jour. Nerv. and Ment. Dis., Mar., 1901. ² Jahrb. f. Psych. u. Neurol., 1900.

³ Monat. f. Psych. u. Neurol., Sept., 1900. ⁴ Deut. Arch. f. klin. Med., Bd. LXX.

⁵ Arch. Ital. di Biol., Apr. 20, 1901.

found. In the second case a young man, subsequent to nocturnal epileptic attacks, presented generalized clonic movements which subsided entirely on the use of bromids, but recurred when they were withdrawn and appeared to be an epileptic equivalent.

MENTAL DISEASES.

Classification of Insanity.—F. X. Dercum¹ presents a clinical classification of insanity that is of decidedly practical value and, in many respects, as satisfactory as any classification that has thus far been made. It contains nothing particularly novel, following in some respects the classification of Clouston with modifications bringing it up to a parallelism with the views of Kraepelin. The author especially emphasizes the melancholia-mania syndrome as embracing most of the so-called cases of melancholia or mania. After a lengthy but interesting consideration of the topic he concludes in part that: (1) All of the mental disorders that result from infections, intoxications, diatheses, visceral diseases, etc., including pregnancy, the puerperium, and lactation—in short, all of the diseases and morbid physiologic states—belong to the symptom group of delirium-confusion-stupor-dementia. (2) The melancholia-mania syndrome bears no relation to the various infections and visceral diseases; mania or melancholia never results from them; melancholia and mania are primary diseases of the nervous system—so to say, neuroses. (3) The delirium-confusion-stupor syndrome may occur in all ages; melancholia-mania and paranoia, on the other hand, are related to definite periods of life. (4) The delirium-confusion-stupor syndrome usually occurs independently. This form may, however, occur as complications or episodes in any of the other affections.

Paretic Dementia.—David Orr and R. G. Rows² finish a report and careful study of the **posterior root ganglia** in the human being and the changes present in them in paretic dementia. The changes described are insignificant in comparison with the amount of degeneration in the posterior columns, even in cases that do not present the usual tabetic features; and they think that the changes in the posterior columns in both tabes and paretic dementia are likely due to toxins in the circulation, which simultaneously attack the nerve-fibers everywhere in their course, not acting primarily upon the cell-body.

L. C. Bruce³ contributes an important study of paretic dementia and allied conditions in the spinal cord, especially tabes. He calls particular attention to the **condition of the alimentary system** and the evidences of remittent or chronic intestinal septic states. He also points to a peculiarity of temperature in general paresis, indorsing McPherson's opinion that the most characteristic temperature curve indicates a recurring febrile attack every few weeks. An examination of the blood for leukocytosis shows there is a tendency to increase in the white blood-corpuscles contemporaneous with the elevation of temperature. To

¹ Jour. Nerv. and Ment. Dis., Sept., 1901.

² Brain, Summer, 1901.

³ Brit. Med. Jour., June 29, 1901.

explain these temperature curves he calls attention to the condition of the intestinal tract, which presents almost invariably a swarm of colon bacilli. He notes the additional significant condition that the blood of the general paralytic has no power of agglutinating *Bacillus coli*, as tested in 10 cases. Remissions have occurred after acute erysipelas, pneumonia, carbuncles, etc., such remissions being preceded by long-continued hyperleukocytosis. To produce remission by the use of a special serum from a case of general paralysis during a well-marked remission, by means of wet cups blood was obtained and defibrinated. This was subsequently injected into 2 cases of acutely progressive general paralysis in doses of 2 cc. daily for 3 weeks. After 2 years he reports that the first case has fairly recovered, that his friends insisted upon his discharge, and, though he still shows motor signs of general paralysis, mentally he is fairly well. In the second case there was continuous physical improvement but no mental gain. The author believed that the brain had already been injured beyond repair. He concludes: (1) General paralysis is a disease directly due to poisoning by the toxins of bacteria, whose point of attack is through the gastric and intestinal mucous membrane. (2) The poisoning is probably a mixed poisoning, but the *Bacillus coli* is apparently one of the noxious organisms. (3) The result of treatment with serum taken from a case of general paralysis in a condition of remission, and injected subcutaneously into an early progressive case, points strongly to the fact that some form of serum treatment is the proper treatment for this as yet incurable disease.

W. F. Robertson¹ attaches particular importance to the **gastro-intestinal lesions** in general paralysis. There is invariably, in his observation, a chronic catarrhal change resulting from irritants that bathe the internal surface of the bowels. He believes that in this disease there is a toxemia of gastrointestinal and bacterial origin. He concludes, with Bruce, that general paralysis depends upon a condition of gastrointestinal autointoxication resulting from the excessive growth of microorganisms which normally inhabit the alimentary tract, and particularly those belonging to the colon group. This toxemia is probably established for months or even years before the first symptoms of nervous disease manifest themselves. In some individuals the cerebral vessels first yield, and general paresis is the result; in others the vessels of the cord are the more vulnerable, and the clinical picture of tabes dorsalis develops. The part that syphilis plays in the pathogenesis of general paralysis and tabes is probably that of profoundly altering the natural immunity. The chronic toxic state, arising from the condition of the alimentary tract, induces the secondary condition of tabes or parietic dementia. This particular reduction of resistance secondary to syphilis he suggests may be explained by the hypothesis that the condition depends upon a partial exhaustion of the leukoblastic function of the bone-marrow. The repeated attacks of fever finally exhaust this bone-marrow function. Under this diminished ability to

¹ Brit. Med. Jour., June 29, 1901.

furnish leukocytosis the bacteria of the colon group thrive, with the deleterious results already indicated. Examination of the bone-marrow in a number of cases of general paralysis has always proved it altered in structure. He would summarize his conclusions as follows: (1) General paralysis is dependent upon the occurrence of a chronic toxemia of gastrointestinal origin. (2) The toxins are mainly bacterial, and are formed in consequence of a partial breakdown of those forces by which the harmful development of the microorganisms that constitute the ordinary flora of the alimentary tract is normally prevented. (3) The toxins are absorbed and tend specially to produce proliferative and degenerative changes in the vessels of the central nervous system. (4) These vascular changes tend to set in earliest in those parts of the brain that are relatively best supplied with blood, because their walls are brought in contact with the largest quantity of toxin. (5) *Tabes dorsalis* is dependent upon the same form of toxemia. (6) The part played by syphilis in the pathogenesis of general paralysis and *tabes dorsalis* is essentially that of altering the natural immunity. (7) There is some evidence in favor of the hypothesis that this alteration in the natural immunity is dependent upon commencing exhaustion of the leukoblastic function of the bone-marrow. (8) The treatment of general paralysis and *tabes dorsalis* should be directed primarily to the correction of the disorder of the alimentary tract. (9) Probably the only means by which it will be found possible to check the excessive growth of the gastrointestinal bacteria is the employment of specific antitoxins. (10) To arrest the disease by such means may be more practicable than would at first sight appear, because it is probable that the specially injurious toxins are the products of only a few bacterial forms.

De Montyel¹ expresses the opinion that **malaria** has a marked etiologic relation to general paralysis, and states that acute malarial infection may cause paretic dementia in persons predisposed. Chronic malaria may not only cause general paralysis in the predisposed, but may also, though exceptionally, cause the disease in persons without any evident tendency. The course of the disease in cases due to malaria is rapid, and the symptomatology and morbid anatomy are the same as in other instances. [The author does not exclude syphilitic infection in the cases which are attributed to malaria, and his statements lack a judicial tone.]

Late Hereditary Paretic Dementia.—R. P. Smith² gives detailed histories of 2 cases of paretic dementia occurring at the ages of 28 and 24 in individuals the offspring of syphilitic parents. The probability of acquired syphilis was decidedly denied, though the absolute exclusion of acquired syphilis presumably would be impossible. The author also refers to Mott's Croonian lecture of 1900, in which the possibility of such cases was mentioned, and the opinion expressed that some cases of paretic dementia in which no syphilitic history could be obtained might still be of prenatal origin though occurring later than the usual age of the juvenile type.

¹ Rev. de Méd., 1900.

² Brit. Med. Jour., Feb. 14, 1901.

Insanity in Twins.—A. Cullerre ¹ reports 2 cases of insanity in twins and is able to find 21 similar instances in the literature. He quotes Soukhanoff, who divides such instances into 3 categories: (1) Those presenting simultaneous onset and parallel psychic features; (2) those showing a disease of analogous course and identical termination; (3) those presenting disease of spontaneous origin developed upon the same organic foundation. From a study of the subject the author does not believe that the identity of the disease occurring in twins can be carried to the point that former communications would indicate, and that there are only resemblances, which, taken altogether, scarcely compensate for the divergent features more frequently encountered. As a rule, these cases belong to the group of diseases classified under the head of developmental psychoses.

Psychoses of the Menopause.—Chapin ² believes that the menopause does not act as perniciously in the development of mental disorders as has been usually believed. Out of 8320 women admitted into various institutions only 188 were alleged to have become insane at the menopause, and the data regarding this number were not convincing.

Surgery in the Treatment of Insanity.—W. J. Mayo ³ presents a very admirable article on the subject of surgery in the treatment of insanity. His experience is based on work carried out at the Hospital for Insane at Rochester, Minnesota. He concludes that the physical condition is usually improved, the operation having been undertaken in every instance strictly on surgical grounds. The results, however, so far as the mental state is concerned, do not justify statements which have occasionally been made as to the influence of bodily disease, especially those of the female generative organs, on the production and maintenance of insanity. In his hands surgery has done much for the physical suffering of the majority of his patients, benefited the mental condition of a few, and but rarely contributed to perfect restoration of mental and physical health. He insists that the insane, from a surgical standpoint, have the same right as the sane, no more and no less.

A. Pick ⁴ contributes an article on the subject of **operations in hypochondriasis** performed for the sake of their mental impression, and refers to recent instances in the literature when such operations have been done to convince a patient with an imagined illness that a tumor or other condition had been surgically removed, perhaps only a skin wound being made. He is unable to find, by searching the literature, a well-authenticated case in which operations of this sort have produced the mental impression necessary to recovery of the patient, and discredits them entirely as a therapeutic measure.

Acute Alcoholism.—H. P. Loomis ⁵ contributes his experience with the administration of large doses of digitalis in the treatment of acute alcoholism. He reports 10 cases. In only 3 was the result so

¹ Arch. de Neurol., Feb., 1901.

² Phila. Med. Jour., Aug. 25, 1900.

³ Med. Rec., Aug. 3, 1901.

⁴ Phila. Med. Jour., Sept. 21, 1901.

⁵ Med. News, Aug. 18, 1900.

pronounced and so prompt that there seems to be no question of cause and effect. In some cases the remedy was an absolute failure. Two of the patients died, presenting, in one case, no lesion excepting the ordinary wet brain of delirium tremens, while in the second petechial hemorrhage was found in the endocardium. The author thinks the digitalis had something to do with death in this latter instance, although it was a desperate case, and complicated by acute articular rheumatism. The digitalis was administered in half-ounce doses of the tincture every 4 hours for 3 days, and stopped sooner if the patient became quiet; if not, another series of 3 doses 6 hours apart was ordered. Cases showing the best results received no more than 3 doses, and the guide to its repetition was the narcotic effect. No disturbance of the pulse was noted in any of the cases, but in the successful ones the pulse seemed to be better, stronger, fuller, and more regular after the first dose. The cold, clammy perspiration disappeared, the skin became warm, and the patient went to sleep. No effect of the remedy on the kidneys was noticed.

CUTANEOUS DISEASES AND SYPHILIS.

By LOUIS A. DUHRING, M.D., AND M. B. HARTZELL, M.D.,
OF PHILADELPHIA.

ERYTHEMAS.

Erythema Multiforme and Vaccination.—Norman Walker¹ refers to 4 cases under his observation, all of them recently vaccinated, and all showing features which seem to make it certain that the vaccination was causally related to the eruption of erythema multiforme. The eruption developed always on the hands and face, but on other parts as well. The type erythema iris was that usually present. At the time of the eruption the vaccination area showed signs of activity. Bowen, of Boston, has recorded 5 cases of bullous dermatitis following vaccination in children, all with a tendency to appear on the hands and face.

Concurrent Erythema Multiforme and Erythema Nodosum.—Edward McCulloch² gives a report of a case in which typical erythema nodosum of the legs, occurring in a lad aged 15, was followed in the same illness by erythema multiforme on various regions of the general surface. The attack followed exposure to rain, and the author regards the disease as one of the expressions of rheumatism. [The symptoms of both erythema nodosum and erythema multiforme are clearly set forth by the author, so that there can be no question of the form of the cutaneous lesions in this case. On the mother's side the family was remarkable in that there was a history of rheumatism in many instances.]

Erythema Nodosum Treated with Ichthyol.—A. Brownlie³ advises ichthyol in erythema nodosum, and in the form of: Ichthyol ammon., ʒij; Sp. vini rectif. ætheris, āā ʒiij. Ft. mist. Sig.—Paint on the lesions. The effect in a given case was most marked, the relief being immediate. The burning pain was greatly lessened after the first application, and in a day or two the pain had all gone, and the temperature was normal. Salophen in 15-grain doses was used internally. The method of preparing the paint is important. The spirit and ether are first mixed together, and then the ichthyol is added. If the ichthyol is put into the bottle first, and the other ingredients added, an insoluble deposit is formed. Previously ichthyol in combination with glycerin and belladonna had been used, with no effect.

¹ Brit. Med. Jour., May 18, 1901.

² Lancet, Apr. 20, 1901.

³ Brit. Med. Jour., Jan. 5, 1901.

Erythema Mercuriale; Idiosyncrasy as to Mercury.—Albert Bernheim¹ records the case of a woman, aged 50, who had a scarlatiniform, follicular, erythematous eruption over various regions of the general surface, which in a few days took on an edematous, erysipelas-like form, but unaccompanied by fever. The eruption was due to a few pills which contained blue mass, 2 grains each, taken 2 days and 1 day previous to the appearance of the eruption. The patient had had similar acute attacks from the same drug on several former occasions, used externally to a very small area as well as taken internally as a purgative.

Scarlatiniform Erythema of Parasitic Origin.—Pascal² reports a number of cases of scarlatiniform eruption occurring in soldiers employed in sifting barley, the eruption being most marked upon the uncovered parts of the body. It was accompanied by severe itching and burning, and in one case fever existed for the first 24 hours. More or less abundant desquamation followed. The affection was found to be due to the irritant dust arising, during the sifting of the grain, from innumerable small butterflies which covered the barley.

Urticaria.—Philippson³ opposes the current opinion held by most dermatologists, that urticaria is due to reflex nervous action exerted on the blood-vessels; he believes with Heidenhain that a secretory action of the vascular endothelium is involved, and that the edema which occurs in this disease is similarly produced by direct action of poisonous substances upon the vessels in the neighborhood. He concludes that, as in the case of erythema, urticaria is a mild inflammation in which the irritant is of low intensity, exerting a more purely local action. [It is now generally conceded by pathologists that urticaria is a distinctly inflammatory affection.]

Case of Bullous Urticaria.—S. H. Carr⁴ records a case of this rare manifestation. It was caused by eating fish. The ordinary form of urticaria was soon followed by large bullas on the lobes of both ears and on the wrists and forearms, simulating closely the effects of a scald. The eruption also severely affected the mouth and pharynx, so that the patient could scarcely swallow, and the lips were excoriated and covered with blood. The highest temperature reached was 103.6° F. There were innumerable small vesicles, which were distinctly seen to rise from the original urticarial wheals, so that there was no question of pemphigus. The itching was very great at first, giving way later to severe burning, and the touch of the bedclothes could hardly be borne. There was much edema about the eyes, which discharged freely, and a quantity of offensive matter came from the mouth.

Urticaria the Result of the Use of Formalin.—Glover⁵ reports the case of a young married woman who, after the application of a lotion to the hair containing formalin in bay rum, suffered from a severe gen-

¹ Jour. Am. Med. Assoc., Jan. 26, 1901.

² Ann. de Dermat. et de Syph., 1900, Nos. 8 and 9.

³ Giorn. Ital. delle Mal Ven. e delle Pelle, 1899, fasc. v; Brit. Jour. of Dermat., June, 1900.

⁴ Brit. Med. Jour., Nov. 10, 1900.

⁵ Brit. Jour. of Dermat., Apr., 1901.

eralized urticarial eruption which appeared the day after the first application was made, and grew worse after a second application. It was considered that, in the absence of other possible factors, the formalin lotion was the cause of the eruption. The lotion, which still remained in the patient's room, giving rise to the characteristic odor, was removed, bran baths were used, and improvement followed immediately.

Urticaria Pigmentosa Following Varicella.—Vauldert ¹ records the case of a male child, aged 3 months, who manifested varicella. Shortly after the cutaneous lesions disappeared characteristic reddish-brown macules associated with urticarial symptoms began to develop. Eight months later the disease was present in typical form.

A Peculiar Case of Dermographism.—Fabry ² reports under this title a remarkable case of chronic factitious hemorrhagic urticaria observed in a woman aged 60 years. The affection began with the appearance of purpuric lesions in the upper eyelids and itching of the neck and breast. Scratching was followed by the appearance of hemorrhagic wheals. About a year before the death of the patient an enormous swelling of the tongue occurred, which never disappeared. The pressure of the clothing was sufficient to produce hemorrhagic wheals which, after lasting 2 to 4 weeks, gradually disappeared without leaving any pigmentation. These never appeared spontaneously, but were always the result of trauma. The disease lasted 3 years and ended in the death of the patient from asthenia.

Dermographia and Anidrosis.—E. V. Mock ³ records a case of a muscular man in whom anidrosis, coming on a few years previously, was followed by dermatographia. There was no perspiration of the skin of the entire body, but there were no disagreeable symptoms owing to this condition. The urticaria-like welts came out after local irritation and remained out about 2 hours.

Treatment of Erysipelas with Iodin and Ichthyol.—Keirle ⁴ has treated 30 cases of erysipelas by the following method with uniform success: The affected area is first inclosed in a ring of tincture of iodine repeatedly painted on from 2 to 3 inches from the edge of the reddened area. At the same time the whole surface inclosed in the ring is covered with an ointment of ichthyol 1 dram, vaselin 1 or 2 ounces. This is covered with a piece of gauze, a hot stupe applied and renewed every 4 hours. At the end of 12 hours the ichthyol ointment is washed off and a fresh coat applied.

A New Local Treatment for Erysipelas.—G. L. Curtis ⁵ advises sodium sulphate as a local application. This treatment is based upon the affinity which sodium sulphate has for oxygen, abstracting it so rapidly from the diseased area as to destroy soon the germs of erysipelas. The application consists in first cleansing the parts affected, especially as to the removal of all greasy substances. A sufficient quantity of

¹ Jour. Am. Med. Assoc., Oct. 21, 1899.

² Arch. f. Dermat. u. Syph., Bd. LIV, H. 1.

³ Jour. Am. Med. Assoc., Mar. 30, 1901.

⁴ Phila. Med. Jour., VII, No. 7.

⁵ Med. Rec., Apr. 20, 1901.

sodium sulphate is mixed with cold distilled water to give it the consistency of a thick poultice. The diseased part is covered with a single layer of gauze, and over this is spread a thick layer of sodium sulphate, extending considerably beyond the margin of the disease. The poultice is kept in place by a few layers of gauze. Ice-water is now applied to the poultice. The author has found that an application of this kind commonly arrests disease in from 6 to 8 hours.

Erysipelas Treated with Antistreptococcus Serum.—J. W. Gill¹ records a case of very severe erysipelas in a lady aged 71, treated with antistreptococcus serum. Without going into the details of the illness, he merely states that in all eight injections, under the skin of the abdomen, of 10 cc. of the serum were given. The case was one of intense severity. Her husband had died of "blood-poisoning," and she had caught the infection from him. The husband, aged 80, had neglected a cut in his hand, with resulting cellulitis. The wife developed the disease in the head, face, and scalp, and was practically comatose for 10 days. The injection was given daily for 6 days, and upon a recrudescence the two other doses were administered. A slow but complete recovery resulted. During the first 10 days there was considerable albuminuria and diarrhea of a severe type, with hemorrhage.

ECZEMA AND PSORIASIS.

Etiology of Eczema.—L. D. Bulkley² gives a complete résumé of the multitudinous predisposing and exciting causes, and is inclined to agree with Brocq that "eczema is the image itself of the life, the reflex on the skin of the constitution of the individual." The parasitic theory of causation was fully discussed at the International Congress, and the results may be summed up as follows: The majority of dermatologists do not regard eczema as a parasitic disease, due to a specific organism. The micrococcus of Unna is almost universally regarded as an ordinary staphylococcus with a slight peculiarity in its growth. Many observers are convinced of a local predisposition to eczema in the seborrheic state and a general predisposition in the circulation of various toxins in the skin, from the improper assimilation of food and other toxin-producing pathologic conditions. [This view is much more in accord with that of the majority of observers than that which insists on parasitism.]

The Parasitic Nature of Eczema.—Scholtz and Raab,³ in a bacteriologic study of 60 cases of eczema representing the principal stages of the affection, found *Staphylococcus pyogenes aureus* almost constantly present. This microorganism was not only found in the serum of moist eczemas and in the scales of the squamous forms, but had penetrated the tissues. Kreibich⁴ concludes from his researches that idiopathic, papulovesicular eczema, such as has been defined by Hebra, as well as the acute exacerbations in chronic eczema, appears independently of all microbe intervention. Nevertheless, after a longer or shorter time the

¹ Brit. Med. Jour., May 4, 1901.

² N. Y. Med. Jour., Nov. 17 and 24, 1900.

³ Ann. de Dermat. et de Syph., 1900, No. 4.

⁴ *Ibid.*, 1900, No. 5.

vesicles are invaded by pyogenic microorganisms which provoke a rapid diapedesis, and transform the serous vesicles into pustules. Attempts to produce acute eczema either by the inoculation of serum from oozing eczematous surfaces, or of cultures of the microbes met with in suppurating vesicles, were unsuccessful. Veillon¹ concludes that the existence of a specific parasite of eczema is not yet demonstrated. The pure, primitive lesions of true eczema do not contain any microbe discoverable by any of the present methods known to bacteriology. The various microbes, in particular the staphylococcus, which grow abundantly in the open vesicles or on the oozing or crusted surface of eczema, are secondary infections whose direct role is not yet elucidated, but which are the cause of most of the complications of eczema, such as furuncle, abscess, folliculitis, etc. [These papers are of interest, especially as indicating recent research in this direction, but do not aid us in the treatment.]

Treatment of Eczema in Children.—Rille² states that tar preparations are contraindicated in children, and that milder applications should be used. For intertrigo he recommends talc as being less liable to form lumps than the vegetable dusting-powders, such as starch and lycopodium. When the genitals are affected, he uses carron oil or lead lotion. In severe cases a 0.05% solution of sublimate lotion is employed. He is of the opinion that ointments aggravate acute eczemas, and recommends a lotion of boric acid, menthol, and carbolic acid (1%) in spirit. In moist eczemas with crusts, after removal of the latter, he applies compresses of silver nitrate (1:400) twice daily for 2 hours, and in the intervals diachylon ointment. Cases of universal eczema are treated in bed, vaselin being applied several times a day, and the inside of the night dress dusted with starch. [We agree with the author that tar is not well tolerated by children, and that mild remedies are more useful than strong ones.]

Arsenic in Infantile Eczema.—Neuberger³ has had good results from the treatment of chronic eczema in infants by the internal administration of arsenic. To infants of 2 years and upward he gives 1 drop of a mixture of equal parts of Fowler's solution and distilled water. This is given in milk after the midday meal, and gradually increased to 6 or 7 drops. In sucklings and infants under 2 years of age he gives 1 drop of Fowler's solution of the strength of 1 in 3, and this is gradually increased to 5 drops. The infants, it is stated, take the drug well, and no bad symptoms are observed. The treatment usually lasts 16 or 18 weeks. Relapses sometimes occur. [The general and much too common use of the arsenical preparations in eczema, and in infants in particular, is in most cases unnecessary, and frequently it is injurious to the system at large as well as to the skin.]

Treatment of Eczema by Lanigallol.—E. Kromeyer and P. Gruenberg⁴ divide this subject up under three headings: (1) The

¹ *Ibid.*, 1900, No. 6.

² *Wien. klin. Rund.*, Mar. 18 and 25, 1900.

³ *Arch. f. Dermat. u. Syph.*, XLVII, 1899.

⁴ *Münch. med. Woch.*, Feb. 5, 1901, and *Brit. Med. Jour.*, May 1, 1901.

sedative treatment, to be applied in acute eczema, by the application of powders, ointments, pastes, etc.; (2) the removal of the chronic tissue-changes in chronic eczema; and (3) the escharotic treatment of the acutely inflamed parts. Their communication deals mainly with the last-named. Of the older forms of treatment they prefer using caustic potash to lunar caustic and other like preparations, but point out the difficulty that exists in choosing the right time and the proper degree of cauterization for the application, and the danger of doing much harm if the time and place are ill chosen. In lanigallol (a triacetate of pyrogallie acid) they claim to have a drug which has the advantages that it cannot do harm; that, as it is an insoluble powder which does not become decomposed when resting on unbroken skin, it cannot produce any ill effects on the surrounding healthy tissue; that on a chronically inflamed surface, such as eczema resembling psoriasis, it slowly splits up into its component parts and the freed pyrogallie acid can act to its utmost advantage; and that whenever the horny layers of the skin are absent, pyrogallie acid is rapidly freed, and thus applies its cauterizing action only on the proper parts—for example, vesicles and pustules. The action of pyrogallie acid, as such, produces its irritant and escharotic effects on healthy as well as unhealthy skin. They apply it as a paste: lanigallol 20%, zinc paste 80%; lanigallol 10%, oil of cade 5%, zinc paste 85%; and lanigallol 10%, ung. Wilkinson 90%. Zinc paste is zinc oxid 1 part, starch 1 part, and white vaselin 2 parts; and ung. Wilkinson is oil of cade 10%, precip. sulph. 20%, soft soap 5%, and zinc paste 65%. They point out that the action is merely superficial, and therefore the combination with other drugs, such as tar, oil of cade, sulphur, soft soap, etc., is required in some cases. They give in detail the account of 10 cases as examples of a great number treated by lanigallol, in each of which the effect was very striking. All acute forms or chronic forms with recurring acute patches seem to be bettered by a judicious application, and as a special recommendation may be added that its employment is particularly appreciated by the patients, as it allays the acute itching which accompanies so many forms of eczema. They end their article by stating that although useless in impetigo contagiosa, syphilis, herpes, pityriasis, etc., it stands first in the list of medicaments for eczema. [This treatment is new and awaits the confirmation of other clinicians.]

Lichen Ruber Pemphigoides.—Bettmann,¹ after referring to reported cases of lichen ruber in which blebs were present, records a new case of his own, and discusses the following questions: (1) Do the cases of lichen ruber in which blebs form represent a special atypical variety of the disease? (2) Is the formation of blebs a consequence of the administration of arsenic rather than the disease itself? (3) Have we to do in these cases with a combination of lichen and pemphigus—*i. e.*, a combination of two different diseases? The author believes that, while in some of the reported cases the bullous eruption was most likely due to the use of arsenic, in others it represented a special variety of the

¹ Dermat. Zeit., 1901, Bd. VIII, H. 1.

affection. [We are disposed to accept the author's conclusions, although in this country vesicular or bleb formation in lichen is very rare.]

Psoriasis Vulgaris in the Infant.—J. H. Rille ¹ reports a case in which this disease occurred in an infant 5 days old, and calls attention to the fact that psoriasis in children often follows one or another of the acute eruptive fevers, and also vaccination. Cases in which the disease occurred early in life have been reported by Billard (3 months), Zeissl (8 months), and Neumann (4 months). [There can be no doubt that psoriasis occurs more frequently in the young than was formerly supposed. It used to be stated by the most experienced authors of all countries that the disease did not occur in infants.]

Thyroid Extract in Psoriasis.—Leonard Weber ² reports that a nervous young woman, with uric-acid and rheumatic symptoms, received one 5-grain tablet of this substance thrice daily for 2 months; at the end of this time all the areas of eruption (some fifty or more) had disappeared. The only local treatment was the application of a 25% aristol ointment. Four months after stopping the remedy no relapse had occurred. Petrini ³ also records the case of a patient cured by this remedy, no local treatment having been employed. Five hundred and forty-three capsules of the drug were taken. [This drug has not been employed much in psoriasis of late, and it is for this reason that attention is again called to a mode of treatment that was much used 10 years ago, especially in Great Britain, and which in certain cases is valuable.]

Eugallol in the Treatment of Psoriasis.—Goldschmidt ⁴ has employed eugallol in the treatment of a number of cases of inveterate psoriasis. A solution made with acetone was painted daily for several days upon the affected parts, and was followed in from 15 to 30 minutes by the application of a zinc paste. The black discoloration which it produces is an objection to its use on the face; but this discoloration only lasts a few days, and may be partially removed by means of ether. Some of the conclusions based upon the results obtained are as follows: Eugallol, used as above described, exerts an extremely rapid and energetic action on psoriatic efflorescence in every stage. In very extensive eruptions this method is too tedious and difficult of application to be employed; but it is excellently adapted for isolated inveterate plaques that are resistant to all other treatment. Toxic effects are never observed, even after the most extended use, or are very unimportant. In some cases it produces slight local irritation, which, however, rapidly disappears when its use is suspended. [Remedies that discolor the skin and clothes are all objectionable in this disease.]

Psoriasis of Rupoid and Bullous Appearance.—Hallopeau and Lemierre, ⁵ at a séance of the Société Française de Dermatologie et de Syphiligraphie, exhibited a man, aged 47, with an extensive pso-

¹ Jour. des Mal. Cut. et Syph., July, 1899.

² Post-Graduate, 1900, No. 9, p. 1103.

³ Bull. de l'Acad. de Méd., Feb. 20, 1900.

⁴ Dermat. Centralbl., III, 1; Jour. Am. Med. Assoc., Apr. 7, 1900.

⁵ Ann. de Dermat. et de Syph., 1901, No. 1.

riasis, in whom some of the patches presented an unusual aspect. The lesions upon the trunk and upper extremities were of the ordinary type, but those upon the legs were covered with extremely thick, yellowish, hard, almost horny scales, which were surrounded by a ring of white epidermis, which was elevated apparently by exudation underneath it. On removing this ring of epidermis, however, no fluid was found, but a whitish pasty material, which was composed of more or less degenerated epidermic cells with a few leukocytes.

The Histopathology of Pityriasis Rosea.—Hollmann¹ finds that in the macular stage of pityriasis rosea the changes are chiefly in the cutis, and consist of a marked widening of the superficial vascular network, a more or less noticeable perivascular cell-infiltrate in the papillary body and the subpapillary layer of the cutis, and edema of the upper part of the corium. In a later stage of the disease all these changes are still more marked, especially the perivascular infiltrate. The mucous layer also shows considerable changes: interepithelial and intraepithelial edema is marked, and there is a proliferation of the prickle-cell layer, especially in the interpapillary portions. Further on in the course of the affection small vesicles are formed beneath the corneous layer of the epidermis. After a time the horny layer is cast off; with this the disease reaches its acme. The author is of the opinion that the disease process begins in the cutis and later involves the different layers of the epithelium. [This disease is in every way worthy of more attention than it has heretofore received from observers.]

A Case of Pityriasis Rubra Chronica Gravis (of Hebra).—Paul Jourdanet,² of Lyons, describes a case of this disease which terminated fatally with marasmic symptoms. There was redness of the entire skin, fine dry desquamation, glandular swellings, and violent itching and burning. [The severe forms of this rare disease as met with in Europe are almost unknown in this country.]

DERMATITIS.

Dermatitis Exfoliativa.—W. A. Phelps³ records a typical case of this disease, illustrated by photographs. The case was that of a healthy, strong, and active farmer, 44 years of age. The present was the second attack of the cutaneous disease, the first having occurred 5 years before the last. There were marked constitutional symptoms, which were varied and such as to cause the man to be confined to bed; there was also violent itching and burning, and a deep red erysipela-tous-looking generalized eruption. The cutaneous inflammation was erythematous and edematous, the edema being so marked and painful that on the third day it was almost impossible to move the hands and feet. On the sixth day there were signs of exfoliation, which proceeded until the man was actually skinned alive. Casts of the hands, fingers, and feet, and large and small pieces from the trunk and limbs were ex-

¹ Arch. f. Dermat. u. Syph., 1900, Bd. LI, H. 2.

² Ann. de Dermat. et de Syph., No. 10, 1900. ³ Buffalo Med. Jour., Feb., 1901.

foliated. On the face the desquamation was fine and bran-like. The exfoliation occurred between the seventh and fourteenth days. Another case recorded was that of a child aged 3 years. Unusually severe general constitutional symptoms preceded the eruption for several weeks. At first it resembled a typical case of measles. Later it became more general and intense, and subsequently the epidermis exfoliated in large sheets again and again. The constitutional symptoms and general illness persisted for 6 weeks; the child gradually became comatose and died with interstitial nephritis and uremia. [It is interesting to note the recording of the general as well as the cutaneous symptoms in this disease, the former often being striking.]

Recurrent Keratolysis or Skin-shedding.—R. M. Stone¹ records a case of this affection, which is analogous to the molting of birds. The subject was a strong, healthy man, aged 50, who shed his skin every year. He was born in May, 1849, and shed his skin in the following July, and since then every summer. In 1893, 1899, and 1900 he shed his skin twice at intervals of a month. The period of shedding is ushered in by a feeling of malaise and chilliness, and is followed by fever with a temperature as high as 103° F. The skin of the body desquamates, but that of the palms, elbows, buttocks, penis and scrotum, knee-caps, and feet comes off in a mass. The hair of the head, eyebrows, and mustache falls, little by little, as after typhoid fever. The nails are also shed. During the period of shedding the patient is able to work. When the skin begins to be shed, perspiration ceases and the epidermis becomes raised and hard, so that when struck it gives off a sound like that of celluloid. The patient's family history is good, and no relative has been similarly affected. [This affection is closely allied to, if not identical with, dermatitis exfoliativa as portrayed in the case above quoted.]

Dermatitis Venenata Due to the Common Ivy.—W. J. Munro² reports a case in which an inflammation of the erythematovesicular type was set up in a woman, aged 40 years, by contact with the wet leaves of the common ivy (*Hedera helix*). In all, four distinct attacks were observed, each attack indicating an increased susceptibility to the poison. The lesions were grouped here and there, and bore a resemblance to herpes zoster.

Arsenical Dermatitis.—A. H. Ohmann-Dumesnil³ records an instance of an eruption of vesicles and pustules on the face, especially around the mouth, and buttocks, coming out 2 days after taking a teaspoonful (a large and poisonous dose) of "rough-on-rats" (an arsenical compound) with suicidal intent. There was edema of the face, and the vermillion of the lips was hot and dry, but was free from eruption.

Dermatitis from Arsenic in Stockings.—F. W. Tunnicliffe and O. Rosenheim⁴ give a report of 2 cases in which, in both instances, black stockings were the cause of a marked local disturbance on the

¹ Jour. Am. Med. Assoc., Sept. 1, 1900.

² Australasian Med. Gaz., Jan. 20, 1900.

³ N. Y. Med. Jour., Jan. 2, 1901.

⁴ Lancet, Apr. 27, 1901.

legs. In one case nodules were produced; in the other there was pain with but little inflammation. Samples of the stockings were found to contain arsenic in considerable quantity, and three other black stockings obtained from other and different sources were all found to contain arsenic. [It is interesting to note that the dye was black and not a bright color.]

Vegetative Dermatitis of Nurslings.—Perrin,¹ under the above title, describes 3 cases of an unusual cutaneous affection observed in nursing children. The disease consisted of patches of a deep red, sharply limited, more or less regularly rounded, and distinctly elevated above the neighboring parts. They presented a vegetating surface, and were formed by the union of small papulopustules. The patches varied in size from a quarter dollar to a half dollar, and were situated upon the face, the wrists (usually the extensor surface), and upon the external surfaces of the thighs and legs. The infants seemed to be otherwise in good health, but in every instance were the subjects of a more or less abundant seborrhea of the scalp. The disease was acute, lasting from 15 days to 3 weeks, the duration depending upon whether it was treated or not. Under treatment it rapidly disappeared. Bacteriologic examination showed the presence of yellow and white staphylococci, a small bacillus, and a small coccus. The possible drug origin of the lesions was excluded. [We are not aware that this form of disease has been described in this country.]

Vaccination Eruptions.—Jacob Sobel² states that the postvaccinal lesions are characterized by their multiformity, embracing all types, from erythema to bleb and hemorrhage, the difference in the form being explained, he thinks, upon the basis of individual peculiarity and the resistance with which the tissue-cells of different organisms meet the offending ingredient. In some of the instances of the generalized vaccination eruptions the eruption appeared as early as the fifth day, in others as late as 5 weeks, the most frequent occurring on the tenth or twelfth day after vaccination. The commonest type was the urticarial, usually occurring on the ninth or tenth day. The morbilliform type was not common, only a few instances being observed. The vesicular eruptions proved interesting and puzzling, occurring from 11 to 15 days after vaccination, some of them simulating varicella, but they never possessed all the characters of the varicella lesion. Generalized scarlatiniform eruptions were rather infrequent. Combined eruptions were met with, as urticaria and erythema multiforme, erythema and papulovesicles, scarlatiniform erythema and minute vesicles, etc.; as sequels of vaccination, axillary adenitis, axillary abscess, erysipelas, pseudoerysipelas, exuberant granulations, slough, deep ulceration, hemorrhagic pock (traumatism), hypertrophic scar, marked induration, raspberry growth, and dry exuberant granulations.

¹ Ann. de Dermat. et de Syph., 1900, No. 10.

² Med. News, Aug. 11, 1901.

HERPES, PEMPHIGUS.

Herpes Zoster.—Gaucher¹ states that herpes zoster may be of central origin, either primary and infectious, or symptomatic of a medullary lesion; or it may be of peripheral origin, situated in the territory of the injured nerves. It is in the latter division that the traumatic cases of herpes zoster belong. He reported 3 cases. One was a man of 46, who, after being struck upon the cheek, developed marked herpes zoster, with headache. The second case occurred in a child of 3, who injured the left side of his face. The third was a man in whom, after an injury to his left side, typical shingles appeared.

Herpes Zoster of the Finger.—Suermonprez and Platel² state that the fingers in this disease are not so infrequently affected as is generally supposed. It usually affects the metacarpal or middle phalanges of the fingers, and is very rare on the thumb. The authors believe it to be due, in every instance, to a direct infection of the finger, traumatism being only of secondary importance in its etiology. It differs from herpes elsewhere in the absence in the beginning of local congestion, a large, flat bleb being the first lesion that is noted.

An Outbreak of Herpes Zoster.—C. Dopter³ records an instance of a slight epidemic of sore-throat occurring in a regiment of soldiers, in several of which cases there appeared herpes zoster. Two officers who occupied the same sleeping room were affected, one with intercostal and the other with femoral herpes zoster.

Pneumonic Herpes.—Talamon⁴ says that between herpes zoster and pneumonia there is more of a relation than a coincidence. The two affections have certain microbic connections demonstrable by recorded instances. The vesicle of zona is not produced directly by the pneumococcus, but is an expression of trophic trouble of the skin, the consequence of irritation or inflammation of nerve filaments. If the zona is intercostal and is superposed on the pneumonia, it may be supposed that there is propagation by extension of the pneumonic infection from the lung to the nerve. But if the herpes appears at a distance, the action of the pneumotoxin on the nervous system is probable. Talamon concludes that zona is in certain cases a pneumococcic infection of the skin.

Pemphigus of the Newborn.—Bloch⁵ distinguishes a benign and a malignant form, the latter resembling foliaceous pemphigus and also Ritter's exfoliative dermatitis, being nearly always fatal. It represents a generalized infection, due in most cases to streptococci, the mode of infection being not always clear. It is contagious, and is often spread by the midwife. The article is based on 20 cases, studied clinically, anatomically, and bacteriologically.

Case of Pemphigus Neonatorum in an Infant Three Days Old.—Charles J. Glasson⁶ states that the blebs began on the third day and

¹ Bull. et Mém. de la Soc. Méd. des Hôp. de Paris, 1901, No. 7.

² Jour. des Mal. Cut. et Syph., Dec., 1899.

³ Gaz. des Hôp., Dec. 5, 1899.

⁵ Arch. f. Kinderh., Bd. XXVIII, 1900.

⁴ La Presse Méd., Apr. 24, 1901.

⁶ Lancet, Mar. 9, 1901.

spread rapidly; the temperature was 104° F., the bowels were constipated, and the urine scanty and offensive. Syphilis as a factor of the disease was excluded. The blebs were opened and a simple antiseptic treatment adopted, under which and 1-minim doses of liquor potassii arsenitis complete recovery gradually took place in 7 weeks. There was exfoliation of the epidermis of the entire general surface. No history of infection could be obtained.

Identity of Pemphigus of the Newborn and Impetigo Contagiosa.—R. Matzenauer¹ considers this subject from its several standpoints, coming to the conclusion that the affections are identical in nature. Other observers have reached the same conclusion. Histologically the affection has its seat between the mucous and horny layers, and bacteriologically similar cocci are found in both. The heavier crust formation which occurs in impetigo contagiosa may be explained by the older age of the subject in which this disease is usually met.

Variations in the Elimination of Urea in Dermatitis Herpetiformis.—Hardouin,² as the result of his observations, concludes that there is a constant relationship between the variations in the excretion of urea and the eruption of dermatitis herpetiformis. The attacks always take place after a period of hypoazoturia, and coincide with a considerable increase in the elimination of urea. This increase may, however, have begun before the outbreak or may be the immediate sequence of it.

ACNE, IMPETIGO.

Acne of the Face.—A. Phillipson³ recommends in the milder forms of acne the following lotion, rubbed in night and morning with a piece of cotton: *Acidi acetici, tinct. benzoini, spts. camphoræ, āā ℥xlv; alcoholis q. s., ad ʒiiss.*

Ulcerous Acne.—Linthlen⁴ employs for the atrophic or ulcerous acne, which invades most frequently the face, causing the formation of depressed cicatrices, compresses soaked in a 1% or 2% solution of sea salt, applied at night. In the daytime a pomade containing 1 or 2 parts of sea salt in 100 parts of lanolin is used. The ulcers soon became clean, healed up, and did not recur, nor did any new lesions appear.

Acne.—F. H. Barendt⁵ uses neither soap nor water, but instead employs hot oil as a wash, on the principle that this easily dissolves solid fatty matter. By this means comedones are dissolved and the skin softened in preparation for the application of sulphur. Lanolin, as it approximates the composition of human fat, is a valuable base, especially mixed with oil, vaselin, or benzoated lard.

Treatment of Acne by X-rays.—Ullmann⁶ reports a case of severe acne of the back in a patient aged 16, treated by the x-rays. Fifty exposures of half an hour were given. After fifteen sittings the acne

¹ Wien. klin. Woch., No. 42, 1900. ² Ann. de Dermat. et de Syph., 1900, No. 11.

³ Jour. Am. Med. Assoc., Mar. 16, 1900.

⁴ Wien. klin. Woch., Aug. 2, 1900.

⁵ Liverpool Med.-Chir. Jour., No. 38.

⁶ Wien. klin. Woch., No. 8, 1901.

spots swelled, and there was diffuse erythema of the skin. Afterward the acne lesions shrank, while the skin over them exfoliated.

Acne Telangiectodes.—Albert Jesionek ¹ gives a lengthy report on a case of this form of disease, which is regarded as identical with the "disseminated follicular lupus simulating acne," "lupus miliaris," etc., of other authors. The histologic examination revealed a condition like that found by Spiegler in Kaposi's case. No tubercle bacilli were found, but a development very common to many sections of tissue examined consisted of a milium-like epithelial cyst formation and a degeneration of the hair-follicle. This degenerative process of the follicle extended deep into the corium and even into the subcutaneous tissue. The author does not think that the disease should be regarded as a colloid-milium nor as a lupus, nor that the term acneiform conveys a good idea of the clinical picture.

Treatment of Acne Rosacea with Suprarenal Extract.—Munro ² administers suprarenal extract both internally and externally to cause constriction of the dilated blood-vessels in the affected area. Tabloids of 5 grains are given at first twice daily, and increased to six daily. If giddiness or nausea occur, the dose is reduced or the drug temporarily discontinued. Locally the extract is applied as a paint by dissolving one tabloid in a dram of sterilized water, and painted on each night after hot bathing. The first application causes smarting and hyperemia, which soon passes off, leaving the parts anemic. In addition to this the face is bathed with hot water, and the following lotion applied and allowed to dry: Precipit. sulphur, $1\frac{1}{2}$ drams; zinc oxid, 2 drams; calamin, 3 drams; glycerin, 2 drams; rose water, 6 ounces. The object of this is to prevent the formation of pustules. This treatment does not apply to hypertrophic forms of the disease.

Acne Treated with Ichthyol.—Geo. T. Elliott ³ speaks highly of this drug in a watery solution, from 5% to 50% strength, especially in cases in which there is much pustulation. In a 50% solution it often aborts the lesions.

Potassium Iodid in Acne.—Galloway ⁴ reports the case of a man suffering from acne vulgaris, who treated himself with a certain "blood mixture," a severe iodid rash being the result. This in time disappeared, and as there was no recurrence of the acne, the author thinks that iodids are worth a trial in cases of acne, provided precautions are taken not to produce too severe a reaction, and to warn the patient what to expect. Potassium iodid as a cure for acne, especially acne indurata, was recommended in doses of 5 grains thrice daily by Levisseur.⁵ The drug should be discontinued when the local reaction occurs, or when there is iodine in the urine. When inflammation subsides, the treatment should be repeated.

A Clinical and Bacteriologic Study of Impetigo.—Sabouraud ⁶

¹ Deut. Arch. f. klin. Med., Bd. LIX, H. 1 u. 2.

² Treatment, Mar., 1901.

⁴ Practitioner, May, 1900.

³ Med. News, Nov. 17, 1900.

⁵ N. Y. Med. Rec., Nov. 11, 1899.

⁶ Ann. de Dermat. et de Syph., 1900, Nos. 1 and 2.

distinguishes two clinical varieties, the first being the impetigo contagiosa of Tilbury Fox; the second the impetigo of Boeckhart, characterized by rounded pustules, each containing a hair in the center and having pustular contents from the beginning. Impetigo contagiosa is a contagious, autoinoculable malady in which the streptococcus is constantly present. It may assume an ulcerative form, and thus become eethyma, an affection which the author thinks has incorrectly been made a morbid entity. Secondary infection by the staphylococcus almost always occurs and causes suppuration. Pustules of purely staphylococcic origin may be produced between the lesions of impetigo contagiosa. In the author's opinion the streptococcus of impetigo is the streptococcus of Fehleisen.

An Epidemic of Impetigo Contagiosa.—Ohmann-Dumesnil¹ reports 13 cases that were traced from one individual to another. With one exception all occurred in infants or children. The cases were observed for the most part in several families. Antiseptic ointments of camphor and carbolic acid were successfully employed. The author calls attention to the point that the diagnosis should be made early, and treatment instituted before opportunity for spreading has been given.

Impetigo Adenosa.—N. E. Aronstam² describes 10 cases of a peculiar type of cutaneous affection to which, since he has failed to find it described or mentioned in any work on skin diseases, he gives the above title. It is an acute contagious febrile affection characterized by pustules and accompanied by enlargement of the lymphatic glands. It is contagious, since members of the same family were consecutively affected with it; also tenants in the same house and in dwellings in the immediate vicinity were attacked. The cases observed were in children between 3 and 10 years of age. All of the patients complained of pain in the joints, vomiting of a protracted type, and in many of the cases chills and convulsive movements. The pustules were glistening, contained a yellow translucent fluid, and were surrounded by an erythematous zone of bright scarlet. Simultaneously with the appearance of the eruption, the lymphatic glands of the groin, axilla, and neck began to enlarge, some even becoming as large as an egg. Fluctuation could never be detected. With the rupture of the pustules the febrile and constitutional phenomena declined. After rupture the contents of the pustules dried up and changed into crusts of a yellowish hue, and encircled by a somewhat raised border of mahogany tint, which in turn was surrounded by a deep red area.

Paste for Impetigo.—Scholz³ gives the following formula: Precipitated sulphur, 10 parts; zinc oxid, rice powder, each, 20 parts; glycerin, distilled water, each, 25 parts; M. This is to be well shaken before being used. Apply after the crusts have been removed, and allow to dry on.

¹ St. Louis M. and S. Jour., June, 1900.

² Med. Age, June 10, 1900.

³ Deut. Aerzte-Zeit., Sept. 15, 1900.

FURUNCLE, GANGRENE.

The Treatment of Furunculosis.—Gustav Longmann¹ applies the cathode, which exhibits more intense reaction upon the tissue, upon the furuncle, the anode being applied somewhere in the neighborhood. A current of about 2 to 5 milliamperes is applied for from 5 to 10 minutes. As a rule, one sitting daily is sufficient. The intensity of the current should vary both with the stage of development of the boil (the earlier stages being more sensitive) and with individual sensitiveness. Whenever there is extensive suppuration a flat pledget of cotton soaked in a 1:1000 solution of corrosive sublimate is placed between the sponge and the skin. Whether this powerful antiseptic has a beneficial cataphoric action or not is not certain. Under this treatment some boils disappear after one or two applications; others may require as many as eight; on the average four or five sittings terminate their existence.

Dermatitis Gangrænosa Infantum.—Judson Lipes² relates a case which came under his own observation in a female child, aged 2 years and 3 months. The points of interest about the case are: (1) The fact that the disease commenced as a large flattened bleb, which ruptured spontaneously, the derma becoming gangrenous and gradually sloughing off from the periphery toward the center. (2) The large size of the lesion, which extended from a little below the umbilicus upward for a distance of 12 to 14 centimeters, the transverse diameter being somewhat less. (3) A short time after this lesion appeared, erythematous spots, from a pea to a 25-cent piece in size, were observed about the anterior part of the neck and upper anterior margin of thorax. In some blebs developed, but there was no gangrene. (4) There was a trace of albumin in the urine, which was otherwise normal. (5) The fourth week after the appearance of the large abdominal lesion a condition corresponding to that of postdiphtherial paralysis was observed. The legs were symmetrically paralyzed and the knee-jerk was lost. Recovery came about slowly, the loss of motion in the legs enduring longest, but was ultimately perfect. Lipes considers the bullogangrenous lesion was due to a paralysis of the arterioles, this being a primary manifestation of a toxic neuritis caused by the presence or elimination of some chemie product of the growth of some organism—in all probability the tubercle bacilli—which showed itself later in the temporary paralysis of the legs. There was a decided tuberculous history in the case. The author recommends quinin and arsenic internally, together with local antiseptics by boric acid solutions, etc.

A Case of Noma of the Auricles Due to Streptococcus Pyogenes.—F. H. Verhoeff³ reports a case of this rare disease occurring in an infant aged 5 months. For 5 weeks previous there had been a dis-

¹ N. Y. Med. Jour., 1900, No. 1122, p. 854.

² Albany Med. Ann., vol. XXI, No. 1, 1900, p. 1.

³ Jour. of Boston Soc. of Med. Sci., May 7, 1901.

charge from each ear, which at about the fourth week began to irritate the skin of the auricles, ulceration occurred, and on the seventeenth day after admission to the hospital death occurred, by which time the cheek had been partly invaded and the lower portion of the auricles destroyed by the gangrenous process. On the seventh day after admission to the hospital the left great toe and the right little finger became red and swollen, and got better and worse from day to day. There was also considerable diarrhea. The autopsy showed the diagnosis to be streptococcus otitis media and mastoiditis, streptococcus gangrenous ulceration of auricles and cheeks, streptococcus synovitis, streptococcus bronchopneumonia, streptococcus septicemia, croupous colitis. The facts would go to show either that the patient possessed very little resistance to the streptococcus or that the latter was extremely virulent. The evidence that has of late accumulated goes to prove that *Streptococcus pyogenes* is probably the chief factor in the production of most cases of this disease. A photograph of the gangrenous ulcer accompanies the article.

Veld Sore.—W. H. Harland¹ thinks that the term "veld sore" should be used to describe a cutaneous lesion distinct from that following some injury or abrasion of the skin which has become dirty and infected. The author has experienced two attacks of veld sore on his own person. It begins as a small papule, often attended with itching or smarting, shows a clear yellowish serous fluid, becoming in a day or two turbid. The skin is very thin and easily broken. The most probable cause is the sting of a large brown horse-fly. Cases of veld sore are at times very numerous. The treatment is incision and the use of antiseptics. A feature of the lesion is the scarring which ensues. Alexander Ogston² regards the disease as peculiar to South Africa, never having met with it in the Sudan. The lesion resembles epidermic vesication, but it is not a vesicle. Suppuration is not a characteristic. It resembles the "digital erysipeloid vesication" met with in European countries, and yields to the same line of treatment.

PARASITES.

A New Case of Protozoic Dermatitis.—D. W. Montgomery³ reports the following interesting case: A man, aged 21, entered the German Hospital of San Francisco apparently suffering from pulmonary tuberculosis. His disease began with cough 7 or 8 months previous to his entrance into the hospital. The skin lesions, the first of which appeared over the right eye, began as dark red, circumscribed nodules, with purulent summits. These, ulcerating, caused ulcers with overhanging, ragged edges, with dirty, uneven floor, covered with crusts. The nodules, which became quite large, projected from the skin and were constricted at the base, resembling the lesions of mycosis fungoides and those occasionally seen in potassium iodid poisoning. They caused no noteworthy discomfort nor were they tender upon pressure. They

¹ *Ibid.*, Apr. 20, 1901.

² *Ibid.*, Apr. 20, 1901.

³ *Brit. Jour. of Dermat.*, Oct., 1900.

were situated upon the scalp, face, arms, neck, buttocks, and thighs, and numbered between 25 and 30. Microscopic examination showed coccidioid microorganisms in great numbers. The patient dying 2 months later, the autopsy disclosed numerous large abscesses in the neck, in the subcutaneous tissue over the chest, in the pleural cavity, and in the lungs, all communicating with one another. In the pus of these abscesses coccidia-like bodies were easily demonstrable. The lesions were composed of granulation tissue with giant cells and numerous small abscesses. The microorganisms were found in the giant cells and were scattered free in the granulation tissue, but were very rare in the abscesses. Inoculation of a rabbit was without result. [A number of these cases have now been reported, and they are especially interesting clinically because they resemble lupus so closely as to be indistinguishable in most cases.]

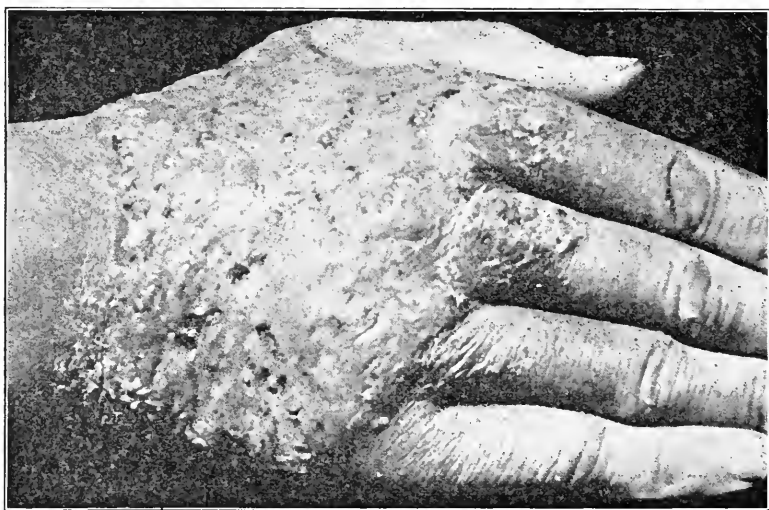


Fig. 3.—Blastomycetic dermatitis (Stelwagon, in *Am. Jour. Med. Sci.*, Feb., 1901).

Report of a Case of Blastomycetic Dermatitis.—H. W. Stelwagon¹ gives the results of a study of his case, which is illustrated by photographs. The fungous cells found in the specimens by the author and Rosenberger were substantially the same as those found by other observers in this disease, although they were somewhat smaller. No tubercle bacilli could be found. The resemblance clinically of this disease to tuberculosis verrucosa is very striking, so much so that a diagnosis could hardly be made without a histologic and bacteriologic examination.

The Transmissibility of Animal Scabies to Man.—Alexander² reports 3 cases of scabies, 2 in children and 1 in a woman, contracted

¹ *Am. Jour. Med. Sci.*, Feb., 1901.

² *Arch. f. Dermat. u. Syph.*, 1900, Bd. LII, H. 2.

from domestic animals, and concludes that the itch of domestic animals,—and of wild animals also when these come in contact with man,—so far as it is produced by a sarcoptes, is transmissible to man. It usually runs a mild course, lasting not more than 8 weeks, and is readily influenced by antiparasitic remedies. It is worthy of remark that the localities affected by preference in human scabies are usually exempt, the eruption showing no predilection for any region. Typical burrows, as a rule, are wanting, and the demonstration of the mite is difficult.

Peruol in Scabies.—Sachs¹ treated 35 cases of scabies successfully in the Breslau clinic with peruol. This substance, which represents the most active element in balsam of Peru, is a clear, odorless oil which does not irritate the skin nor soil the clothing, but is fatal to the itch-mite. After a bath (with soap, if the skin was not too much inflamed), the oil, diluted with 3 parts of castor oil, was vigorously rubbed in three or four times. [At times peruol proves irritating.]

Recent Clinical Observations on Tinea Versicolor.—C. W. Allen² thinks that there is still much to be learned from further study of this common disease. He again directs attention to the existence of the disease in the pubic region, where the lesions are apt to escape detection on account of the hair, believing that they are often the source of renewed contagion. While the disease is one involving chiefly the general superficies of the epidermis, the apertures of the follicles are the central starting-points of the growth; hence the importance of persistent treatment. The use of tincture of iodine or Lugol's solution of iodine is recommended in suspected cases as a means of differential diagnosis, Lugol's solution in particular giving a deep mahogany or dark brown color to lesions in which the fungus still exists. An ointment made of calcium bisulphid in saturated solution 50, lanolin 20, lard 30, is recommended, also Lugol's solution, soap, and sand or pumicestone soap.

Pityriasis Versicolor of the Face.—William S. Gottheil³ records (with a photograph) a case occurring in a young negro, the disease occupying both cheeks, the right eyelid and temple, and nowhere else on the skin. It looked like a pure pigment atrophy,—one of the leukodermas not uncommon in the dark-skinned races,—and it was so diagnosed at first. The microscope showed the *microsporon furfur*. It was rapidly cured by a solution of corrosive sublimate, 1:3000, in tincture of soft soap.

Powell⁴ calls attention to the frequency of *tinea versicolor* of the face in Assam, India. In less than 3 months he saw 56 cases, 9 of which were examined microscopically, and in all of these the *microsporon furfur* was found. On black skins the patches are of a chamois-skin color. The fungus seems to be identical with the European variety. The author attributes the frequency of the affection to the fact that the natives anoint the face and body with oil, and seldom use soap.

Ringworm Infection in Man and Animals.—J. L. Bunch⁵ de-

¹ Deut. med. Woch., 1900, No. 39; Dermat. Zeit., Bd. VIII, H. 1.

² Jour. Am. Med. Assoc., Apr. 6, 1901.

³ Med. Rec., Apr. 27, 1901.

⁴ Brit. Jour. of Dermat., Apr., 1900.

⁵ Brit. Med. Jour., Feb. 9, 1901.

scribes 8 cases in which the fungus was derived from animals of various kinds; but it must not be supposed that this form of ringworm is common, because the author examined many animals which, though believed to be suffering from ringworm, really had other diseases. Valuable though microscopic examination is in enabling a diagnosis to be made, greater reliance must be placed upon cultures, which either confirm the conclusions derived from the microscope or serve to differentiate those cases in which otherwise a differential diagnosis could not be made. Cultures soon clear up the diagnosis. In cases, for example, in which the spores are so closely packed that their shape necessarily appears round, the microscope is quite unable to distinguish between *microsporum* and *ectothrix*.

The Experimental and Clinical Properties of Achiorion Schonleinii.—Bukovsky¹ concludes from experimental inoculations upon the skin and into the animal organism of man that the quality of the soil plays a great part in the fate of the fungus. The more indifferent the skin shows itself to the invasion of the fungus, the more the danger of the occurrence of favus; the stronger the inflammatory reaction, the less the tendency to the disease. The occurrence of vesicular inflammation makes the formation of a scutulum impossible. The achiorion is not toxic for the animal organism. After its intravenous injection there arises in the lungs the macroscopic picture of a mycotic pseudotuberculosis. Microscopically leukocytic nodules are seen with giant cells of epithelial origin around the threads, but the fungus grows only in a rudimentary manner owing to cellular infiltration hindering its vegetation.

Formaldehyd in the Treatment of Tinea Favosa.—Demidoff² has used formaldehyd with excellent results in a number of cases of this disease. Adherent crusts are painted with a 5% to 10% solution, and the scalp covered with a layer of cotton and gauze to prevent evaporation and to render the action of the drug more lasting. Redness and burning of the skin follow the application. In a patient who had been affected with favus for years and who had become almost completely bald, the application of formaldehyd effected a perfect cure.

Hydrogen Dioxid in Tinea Favosa.—Simonelli³ states that he has successfully employed hydrogen dioxid in 3 cases of tinea favosa. The application was made by saturating compresses in dioxid of 10% to 12% strength. Epilation was required only once and the patients made a much more rapid recovery than is usual by any other method.

Acute Dermatitis Caused by the Use of a Hair Dye Having for its Base the Hydrochlorate of Paraphenylene Diamin.—A. D. Newborn⁴ reports not only a case under his own observation, but refers to others, chiefly French cases. The face, forearms, and thighs were all affected with an eruption resembling eczema. The hair dye is well known in France, and cases of inflammation following its use are common there. In commerce the dye is found in two solutions, No. 1

¹ Arch. f. Dermat. u. Syph., 1900, Bd. LI, H. 3.

² Merck's Arch., Apr., 1901.

³ Jour. Am. Med. Assoc., Dec. 8, 1900.

⁴ Jour. Am. Med. Assoc., May 18, 1901.

containing an aqueous or alcoholic solution of the hydrochlorate of paraphenylene diamine, No. 2 oxygenated water. The hair or beard has at first a violet tint, which becomes darker under oxygenated water, by varying which tints up to jet black may be obtained. The eruption is almost always on the border of the hair, but may spread to the entire body.

Dermatitis Produced by a Caterpillar.—James C. White¹ cites several instances of this kind, all under his own observation. The symptoms were persistent itching, and more or less confluent, urticarial eruption, chiefly upon the neck. The caterpillar was probably the larva of the brown-tailed moth, *Euproctis chrysorrhæa*. The erythematous lesions came on usually a few hours after having been exposed to the caterpillars.

HYPERTROPHIES AND ATROPHIES.

Melanoderma with Cachexia and Pigmentation of the Buccal Mucous Membrane Due to Pediculosis Corporis.—Chatin² reports the case of a man, aged 78, who, in consequence of a severe pediculosis corporis, presented an intense pigmentation of the covered portions of the body, together with numerous slate-colored spots on the mucous membranes of the cheeks. He had also suffered from cough accompanied by great feebleness and emaciation for 2 months, and it was at first thought he might be suffering from Addison's disease, but after a stay of 3 months in the hospital he lost his cachectic appearance, the melanoderma cleared up, and the pigmentation of the mucous membrane of the cheeks completely disappeared. The author briefly reviews the cases previously reported—9 in number. [The existence of the slate-colored spots on the mucous membrane of the cheeks in connection with pediculosis corporis is difficult to explain, but the fact remains that a number of such cases have been observed and recorded.]

Alopecia Areata: Its Etiology.—Lassar³ considers that the irregularity of the manifestation, its sudden advent, the absence of symmetry, the generalization over all hairy regions, and the absence of other symptoms of disease of the peripheral nerves, render the trophoneurotic theory improbable. He thinks there is evidence of contagion and infection, but that the bacteriologic theory still remains to be confirmed. The treatment adopted by him is antiseptic, as follows: The scalp is washed daily with a strong tar soap and treated then with a 2% corrosive sublimate solution, afterward with absolute alcohol with 0.5% naphthol, and, lastly, with 2% salicylic acid in oil. The galvanic treatment has not proved valuable. He recognizes only one variety of the disease. [These views are too general to be acceptable, for there is abundant evidence to show that many cases of alopecia areata—the majority, we think—are due to a disturbance of the nervous system affecting the hairy system.]

¹ Boston M. and S. Jour., June 13, 1901.

² Ann. de Dermat. et de Syph., No. 12, 1900.

³ Dermat. Zeit., Sept., 1900, S. 809.

Green Hair in Copper Workers.—Lewin,¹ of Berlin, gives an exhaustive survey of the effects of absorption of copper on workers in that metal. His conclusions are that a true chronic copper-poisoning does not exist, though the rapid absorption of considerable quantities of the metal by the respiratory or digestive organs may produce a feeling of malaise. The chief chronic effects are seen in the teeth, gums, and hair. The formation of a green or dark blue "patina" is frequent on the former, and is found to contain a large proportion of copper. Green hair is less common, the author having found it in only 8 out of 300 copper workers. The color gradually disappears when the work is abandoned. The question whether the copper is deposited within the hair or excreted on its surface is still unsettled.

Monilethrix.—E. W. Ruggles² reports a case of this affection of the hair, characterized by a nodose or beaded condition, resulting in baldness of the invaded area, whether on the scalp or other portion of the body. There exist alternate enlargements and contractions of the hair-shaft, the enlargements or nodes being long and spindle-shaped, causing marked variations in the diameter of the hairs. The most plausible theory as to its etiology is that it is a trophonemrosis. No bacteria are found. McCall Anderson found 14 cases in 5 generations, and Sabouraud 17 cases in 5 generations. In the present case the legs (both surfaces) were the seat of the disease, the patient being a man aged 36.

Pigmentation of the Skin from Drinking Beer Containing Arsenic: Peripheral Neuritis.—Gale and Hallam³ report 8 cases of peripheral neuritis accompanied by pigmentation of the skin, occurring among beer drinkers; the average amount of beer daily was 3 pints; 6 of the cases were in women, 2 in men. Analysis showed the beer to contain arsenic in dangerous quantity. The illness began with digestive disorders, numbness and tingling sensations in the hands and feet, soon followed by loss of power in the arms and legs. All the cases presented the following signs: (1) Varying degrees of peripheral neuritis up to complete loss of power; (2) brown pigmentation of the skin all over the body, most marked on the abdomen and chest, with, later, desquamation of the pigmented skin; (3) thick desquamation of skin and redness of palms and soles; (4) the mental state was good in all but one case, a known alcoholic.

Warts and Corns.—Daniel⁴ has obtained good results in these diseases of the epidermis by painting the lesions with pure formalin morning and evening, allowing the fluid to be absorbed. The hardening action of the drug soon causes shrinkage, and in the course of a week or two the lesion may be removed bodily.

Scleroderma Following Injury.—Leslie Roberts⁵ reports briefly the case of a child who, when 2 years of age, fell against the edge of a

¹ Deut. med. Woch., 1900, 43, 44.

² Jour. of Cutan. and Genito-urin. Dis., Nov., 1900.

³ Med. Press, Feb. 27, 1901, p. 226.

⁴ Therapist, Feb. 15, 1901.

⁵ Brit. Jour. of Dermat., Apr., 1900.

fender, wounding the surface of the abdomen. Shortly afterward the bruised surface became indurated, and during the next 2 years the induration advanced toward the right shoulder in isolated patches separated by healthy skin. Reaching the shoulder, it descended the arm, following the cutaneous branches of the median and radial nerves. The index-finger became contracted, the thumb stiff, and the skin between the finger and thumb rigid. [Cases of this kind should be classified as morphea rather than as scleroderma.]

Trophic Disturbances in the Mammary Region Produced by the X-rays.—Barthelemy¹ reports the case of a woman who had been treated by exposure to the x-rays for pain in the mammary region, resulting from a blow. During this treatment, which lasted 4 months, the rays had not produced the slightest redness of the skin. At first the epidermis in the left mammary region became strongly pigmented over an area as large as two hands, and this was followed by sharp itching. Six months later superficial desquamation appeared in places, the epidermis coming off in large strips, as the hands desquamate after scarlatina. The skin was thick, white over a considerable area, with red or violaceous zones here and there. [The interesting point in this case is that the cutaneous lesions did not manifest themselves until 5 months after the exposure.]

NEWGROWTHS.

Rapid Cure of Vascular Nevi in Infants.—Unna² states that these arterial angiomas or venous vascular nevi can be readily cured by prolonged gradual compression if applied in early infancy. Later it has no effect. He accomplishes this compression by painting the surface with a mixture of 1 part of ichthyol to 9 parts collodion, two or three times a day. The brown pellicle that forms compresses the nevus beneath until the rapidly growing surrounding tissues have caught up with the excessive growth of the angioma or nevus.

Xanthoma Multiplex.—William Osler³ records 2 cases of this rare affection. Both were in women, aged 39, and both had jaundice, one of 10 and the other of 2 years' standing. Each had suffered from recurrent attacks of pain, vomiting, chill, fever, and sweats, followed by increase of jaundice.

Molluscum Contagiosum of the Sole of the Foot.—Balzer and Alquier⁴ report the case of a boy, 15 years of age, who had had a small tumor on the sole of the foot for 7 or 8 months, which gave him much pain in walking, and which continued to increase in size slowly, notwithstanding various forms of treatment, including two curetings. It was somewhat papillomatous in appearance, of firm consistence, and painful on pressure. As it continued to grow, and all other forms of treatment had failed, it was excised. After excision microscopic examination revealed the structure of molluscum contagiosum.

¹ Ann. de Dermat. et de Syph., 1901, No. 2.

² Jour. Am. Med. Assoc., 1900, vol. XXXIV, No. 17.

³ Jour. Am. Med. Assoc., Mar. 2, 1901.

⁴ Ann. de Dermat. et de Syph., 1900, No. 4.

Tuberculosis of the Skin.—J. A. Fordyce ¹ states that the number of affections which are now included under the general term of cutaneous tuberculosis include acute tuberculous ulceration, usually met with about the mouth or anus in those suffering with pulmonary or intestinal tuberculosis, lupus vulgaris in all its clinical varieties, verruca necrogenica or postmortem wart, and certain conditions called scrofulodermas, when the skin is involved secondarily by extension from ulcerating lymph-nodes, tuberculous osteomyelitis, or from subcutaneous deposits called scrofulous gunmas. It is not sufficient to make a diagnosis of tuberculosis of the skin; we must define in more exact terms the special form in question. The treatment depends on the form that exists, but it is chiefly surgical, the author not even referring to internal therapy.

Treatment of Lupus.—H. R. Varney ² discusses the effect of the x-ray treatment, and cites a case of lupus occurring on the forefinger of the hand. The lesion was ulcerative and had proved rebellious to scraping and other local remedies. It yielded to the x-rays after 8 exposures extending over 14 days. The author adds that in all his experience he has never had any x-ray burns. [In one of the first cases in which the editors of this department of the YEAR-BOOK ever used the x-ray treatment, in a case of lupus vulgaris, a very extensive burn occurred, which was very chronic and slow to yield to treatment, being over a year in healing.]

Tuberculin in the Treatment of Lupus Vulgaris.—E. T. Maynard ³ speaks highly in favor of this mode of treatment in the report of a case of lupus vulgaris seated on the nose, that had long resisted other and well-known heroic methods of treatment. Injections of the "old tuberculin" were given into the forearm, and were followed by redness and swelling of the nose and a rise in temperature. Beginning with 0.001 cc., the dosage gradually rose to 0.09 cc. Several months were occupied in treatment, with the result that satisfactory recovery took place, with no recurrence 3 months after leaving the hospital.

Potassium Permanganate in Lupus.—Hallopeau ⁴ records 4 cases showing very favorable results, this treatment being especially useful in the ulcerating forms. Compresses saturated with 1 : 50 solution of the drug, or the powdered drug itself, were applied daily for 15 minutes. Butté ⁵ also recommends the drug in the same disease, an amelioration being noted after 10 days, the tubercles flattening, nothing remaining after 2 or 3 months but the scars.

Lupus Healed with Röntgen Rays.—Wm. Allen Pusey ⁶ reports, with photographs, a case of this disease in the ulcerative-scarred stage cured by the Röntgen rays (Plate 2). Treatment was continued for some months with interruptions. At the end of 2 weeks from the beginning of the treatment improvement had manifested itself. Ery-

¹ N. Y. Med. Jour., May 11, 1901.

² Med. News, Feb. 16, 1901.

³ Brit. Med. Jour., Dec. 22, 1900.

⁴ Gaz. Hebdom. de Méd. et de Chir., Mar. 21, 1901.

⁵ N. Y. Med. Jour., Feb. 2, 1901.

⁶ Jour. Am. Med. Assoc., Dec. 8, 1900.

PLATE 2.



Pusey's case of impus healed with Röntgen rays. (Jour. Am. Med. Assoc., Dec. 8, 1900).



thema and dermatitis developed from time to time. The treatment consisted of repeated exposures to a weak light of definite strength. The light was produced by a secondary current generated in an induction coil of 30 centimeters spark-length, which in turn was energized by a very weak primary current. The primary current was that recommended by Freund, namely, a current of 12 volts and $1\frac{1}{2}$ amperes interrupted from 800 to 1000 times per minute. The exposures were employed from 5 to 15 minutes, and the distance of the tube from the surface of the skin varied from 15 to 5 centimeters. The adjacent cutaneous surface was protected by a lead mask. The object of the exposures should be to get the required effects of the rays without overstepping the bounds of safety. J. T. Knox,¹ of Cincinnati, reports a case, with photographs, of **lupus of the end of the nose** in a young woman cured by this treatment, which consisted in the application of the rays from 6 to 10 minutes each sitting, every other day, placing the affected parts from 4 to 8 inches from the tube, according to the density of the rays. The entire number of applications was 74. Improvement was apparent soon after beginning the treatment. The rest of the face was shielded with a mask.

The Treatment of Lupus by X-rays.—Thurston Holland² reports, with photographs, a very satisfactory result in the case of a girl with a lesion on the cheek about an inch in diameter. The points of interest were (1) that there were no visible disturbances set up in the skin, as inflammation, nor was there any protection of the healthy skin around the lupus; (2) a very high vacuum tube was used, at a distance of from 4 to 5 inches from the diseased area. The 10-inch coil was worked from a 6-celled accumulator; *i. e.*, a current of from 12 to 13 volts, and with 6 amperes, the actual gap being from 8 to 10 inches in length. Very few exposures were required; in one case 17 primary exposures of 15 minutes each, in another case 10 exposures of 10 minutes each. In proper hands this treatment, according to the author, is devoid of risk to the patient in the form of "x-ray burn." [This method of treatment for this disease and for carcinomas is the most important discovery in dermatology during the year. Up to the present date experience goes to show that the x-ray treatment in this disease is as valuable as, if not more so than, that by concentrated light.]

Treatment of Lupus by the Concentrated Light-rays.—H. W. Stelwagon³ visited Finsen's Institute, Copenhagen, and investigated this new method of treating the disease. The author states that the treatment seems successful. Recurrences are rare and are readily managed. The disadvantage is the time required, the expense, and the constant attention and assistance needed in carrying out the treatment. In slight cases a few months may suffice, but in extensive cases it extends beyond a year. Sunlight and arc lights are both used. In the opinion of many of the assistants and patients the arc lights are preferable, being stronger in action than sunlight. Geo. G. Hopkins⁴ also records

¹ Jour. Am. Med. Assoc., Nov. 10, 1900.

² Dublin Jour. Med. Sci., Mar. 1, 1901.

³ Phila. Med. Jour., Aug. 18, 1900.

⁴ Phila. Med. Jour., Oct. 27, 1900.

his experience in **investigating the light treatment** at Finsen's Institute, which is favorable to the method. Photographs show the great improvement noted in a number of cases, all of which are in women, and he states that almost all the cases he saw under treatment were in women. He states that Finsen was turning his attention to the treatment of such cancers as could be reached by the knife and afterward by the light. In one case of this kind seen, the result was favorable.

A Criticism on the Light Treatment of Lupus.—Edward Stapleton,¹ in reviewing the work done by Finsen, and by others in London and elsewhere, starts out with the idea that now generally obtains, that (1) sunlight and electric light, in a lesser degree, have a deleterious effect on bacteria; (2) that this effect is not dependent on temperature; (3) that the ultraviolet rays are the most bactericidal. Two questions arise: first, Is the curative effect really produced, as it is said to be, by the bactericidal action of the light? and, second, Will the Finsen treatment, with the necessary time and exposure involved, show a gain over the methods already at our disposal sufficient to justify its general adoption? The author concludes from his personal observations and investigations into the work of others, that "any good effect is due almost entirely to an artificial erythema solare, although it is possible that the day is not far distant when we shall be in a position to utilize to the full the bactericidal action of certain rays of the spectrum."

Lupus Treated by Excision.—E. Lang² gives the results of 85 cases of this disease in which the skin was excised and the wound treated by a plastic operation. Of this number 39 are not available for statistics, but the remaining 46 have been free from recurrence for from 1 to 7 years. Most of these had already for years been subjected to medicinal treatment without permanent improvement. In view of the positive results obtainable by surgical intervention, the author strongly advises this method of treatment in all cases in which a radical operation can be performed.

Lupus Erythematosus and Tuberculosis.—Roth,³ after a study of many published cases of lupus erythematosus, concludes that this disease must be regarded as of undoubtedly tuberculous origin, being produced by the toxins of tuberculosis, which, perhaps, have been modified by unknown biologic factors or have undergone some attenuation. The acceptance of certain predisposing, partly local, partly general, conditions of the economy is, however, necessary for the explanation of the process. [This view is not in accord with that commonly accepted. True lupus erythematosus has, we think, nothing in common with lupus vulgaris but the name.]

Lupus Erythematosus and Multiple Carcinoma.—Kreibich⁴ reports a case of erythematous lupus accompanied by multiple carcinoma. The lupus began upon the lower lip some $2\frac{1}{2}$ years before the

¹ Dublin Jour. Med. Sci., Mar. 1, 1901.

² Klin. therap. Woch., Aug. 19, 1900.

³ Arch. f. Dermat. u. Syph., Bd. LI, H. 1.

⁴ Arch. f. Dermat. u. Syph., 1900, Bd. LI, H. 3.



Mycosis fungoides (Schiffmacher, in Deut. Arch. f. klin. Med., Bd. LXVIII).

patient came under observation; later the upper lip and the nose were affected. The carcinoma set in 2 years later. The author regards the case as one of carcinoma developing upon an inflammatory basis, the inflammation, through edema and loosening of the connective tissue, being the cause of the atypical proliferation of the epithelium. [That a carcinoma should develop upon a chronic patch of lupus erythematosus is not difficult to believe when the excessive epithelial proliferation in the sebaceous glands in lupus erythematosus is considered.]

Lupus Erythematosus: Clinical Observations and its Pathology.—J. A. Fordyce and O. H. Holder¹ conclude, from an exhaustive study of the disease, that everything that is to be seen under the microscope points to the fact that this disease is one in which the blood-supply is interfered with. The normal capillary pressure is raised, but the cause of this is open to further investigation. Capillary obstruction and infiltration are two phenomena characteristic of the disease, and they occur probably in the order mentioned. Koch's bacillus of tuberculosis is not present in the lesion. The disease is not a tuberculosis of the skin. Excellent microphotographs accompany the article.

Mycosis Fungoides.—Jacob Schiffmacher² is of the opinion that the structures involved in this disease show the general character of young granulation tissue. (Plate 3.) He is not able to accept the views of certain French and Italian writers, who look upon it as an adenoid or lymphatic growth; against which view is the polymorphy of the cells and the epithelioid character of most of them, as well as the connective-tissue reticulum. The author's investigations lead him to refute the view, often heretofore put forth, that the disease is a form of sarcoma.

The Histogenesis of Melanosarcoma of the Skin.—Schalek,³ having studied 5 cases of melanosarcoma of the skin, concludes as follows concerning the origin of this neoplasm: It arises from pigmented cells of the epidermis, these cells proliferating into the connective tissue and becoming entirely detached from the epidermis. Continuing to proliferate, these cells lose their epithelial character and assume that of ordinary connective-tissue cells and that of those pigmented cells known as chromatophores. The author, therefore, holds to the view of Unna and his followers.

The Treatment of Cancroid.—O. Lassar⁴ records 2 cases, with photographs before and after treatment, successfully healed with Asiatic pills, beginning with a dosage of 1 milligram of arsenic and increasing through a period of months until 1 gram in all had been consumed. The lesions were situated on the side of the nose, and were the size of a large pinhead and a pea respectively. The lesions disappeared entirely. The diagnosis was confirmed in the beginning by the microscope. There was no recurrence of the disease in either case several years after the treatment.

¹ Med. Rec., July 14, 1900.

² Deut. Arch. f. klin. Med., Bd. LXVIII.

³ Jour. Cutan. and Genito-urin. Dis., Apr., 1900.

⁴ Berlin. klin. Woch., No. 10, 1901.

Treatment of Cutaneous Cancer.—Daniel Lewis,¹ in an article based on an extensive personal experience, directs attention to the value of arsenical pastes, stating that: (1) They are to be preferred to any other caustics, as giving less pain during the application; (2) in cases to which they are adapted they are superior to excision, first, because of the greater readiness of patients to submit to their use, and, secondly, because there is less shock and anesthetics are not required; (3) they act in a remarkable degree on the cancer, while the surrounding tissues are comparatively unaffected by them. When properly used, they are free from danger, and the fear, therefore, of poisoning is groundless. The treatment of cancer of the breast, tongue, tonsil, eyelids and orbit, rectum, or any disease involving a large extent of mucous surface by caustics is condemned. Two pastes in particular are considered: Marsden's, composed of 2 parts of arsenious acid and 1 part mucilage of acacia, and Bougard's. The latter is preferred to Marsden's, as it is less painful, forms a drier and less friable slough, and can be safely applied to a larger surface. Bougard's formula is as follows: Wheat flour, 60 grams; starch, 60 grams; arsenic, 1 gram; cinnabar, 5 grams; sal ammoniac, 5 grams; corrosive sublimate, 0.50 centigram; solution of zinc chlorid, at 52° F., 245 grams. The first six substances are separately ground to fine powder. They are then mixed in a mortar of glass or china, and the solution of zinc chlorid added and stirred so that no lumps form. A thick layer is spread on the cancer and left on about 24 hours and then managed in every way as Marsden's paste. The author is particular in directing attention to the powerful effect of these escharotics, and states that they require extreme watchfulness as to the *time* for removing them, the lack of such care being the reason for the unfavorable comments that are often heard about them. The after-dressing is simple.

A Further Note on the Treatment of Epidermoid Cancer.—F. H. Williams² gives a case of cancer of the lower lip, with photograph before and after treatment, the latter showing an apparently sound lip (Plate 4). In this case the gland under the inferior maxilla to the right of the symphysis had been enlarged, but enlargement disappeared after the lip had healed. The author states that we have in the radiation from an excited Crooke's tube, in all probability the x-rays themselves, a valuable therapeutic agent, healing of a lesion taking place without any caustic action having been produced.

Rodent Ulcer and Epithelioma Contrasted.—F. T. Paul³ directs attention to the difference between these diseases, first stating that they are pathologically distinct in origin, appearance, and history. There is a consensus of opinion among pathologists that rodent ulcer commences in one of the appendages of the skin, in contradistinction to epithelioma, which commences in the mucous layer. Rodent ulcer usually begins as a small whitish pimple in the skin, the surface of which is smooth and

¹ Med. Rev. of Reviews, July, 1900.

² Boston M. and S. Jour., Apr. 4, 1901.

³ Brit. Med. Jour., Feb. 9, 1901.

PLATE 4.



Epidermoid cancer of the lip (1) before and (2) after treatment by the X-rays. The photograph for figure 2 was taken directly after healing. The induction had wholly disappeared; the lip where the growth had been was without scar and perfectly smooth and soft; it was a little wider on the right side, otherwise there was nothing abnormal in its appearance. Some weeks later this increase in width had diminished so that the overall result was perfectly satisfactory, even better than is shown in the cut. The patient shaved off his mustache the day before the photograph was taken (Williams, in *Boston M. and S. Jour.*, Apr. 4, 1907).

often shiny from thinning of the epidermis, whereas in epithelioma the affected area is roughened and often warty. Rodent ulcer is limited to skin tissue, whereas epithelioma may occur wherever squamous epithelium exists. Rodent ulcer very rarely infects the lymphatic tissue. It tends in its course to marked erosion and destruction, destroying in its progress all kinds of tissue, and very rarely, except in the beginning, forming a solid formation or growth outward, and in this differing from epithelioma. Radical surgical treatment is recommended.

Treatment of Rodent Ulcer by the X-ray.—J. H. Sequeira ¹ makes a report, illustrated with several photographs, based on 12 cases. Eight were still under treatment, and 4 were under observation, 10 ulcers having healed. All cases were deemed to be unsuitable for surgical treatment. In one case the patient could not bear the pressure of the special apparatus which is used in the Finsen method to render the parts under treatment anemic. The current used was one of from 3 to 4 amperes. The coil was one producing a 10-inch spark, and the tube was placed about 6 inches from the ulcer, the adjacent parts of the skin being protected by a layer of lead-foil. The treatment lasted 10 minutes, and was repeated daily. At the end of a week the ulcer was cleaner and somewhat shallower, and a month later the improvement was remarkable. In another month the ulcer had almost entirely healed. [The great value of this treatment in various forms of carcinomatous disease is now being rapidly demonstrated in various countries. The editors can testify to some remarkable cures.]

THERAPEUTICS.

Radiotherapeutic Experiences.—Hermann Benedikt ² considers especially the topic of epilation by means of the x-rays. The color of the hair is a question, as experience teaches that in blond subjects the hair falls much quicker than in dark-skinned subjects. Another question is, On what region is the hair to be removed? Thus, the cheeks are the most readily affected, next the chin, neck, chest, back, and the extremities. Cases are cited, from which it may be concluded that epilation by this method of treatment always succeeds, but the patient should always be informed that the method is slow, many (from 25 to 100) sittings being usually required, but that the relief is generally permanent. Allusion is made to the great value of this treatment in lupus, sycosis, chronic eczema, and the like.

Röntgen Rays in the Treatment of Cutaneous Diseases and for the Removal of Hair.—W. A. Pusey ³ states that the effect of the rays upon the skin and subcutaneous tissues are all more or less inflammatory in character. The two actions of the Röntgen rays on tissues which offer the most promising prospects of utilization for therapeutic purposes are: (1) Its power of causing the falling out of the hair, and

¹ Brit. Med. Jour., Feb. 9, 1901.

² Wien. med. Woch., No. 11, 1901.

³ Jour. Cutan. and Genito-urin. Dis., July, 1900.

(2) its power of causing inflammatory reaction and influencing the nutrition of connective tissue. Undesirable results are to be avoided. One should not use a current of more than $1\frac{1}{2}$ amperes and 12 volts strength, this current, of course, being much weaker than that employed for skiagraphy. An inductor of more than 30 centimeters spark-length should not be used, nor should exposures be too long or too frequent. At the beginning the sittings should not be longer than 5 minutes, and the distance of the tube not more than 15 centimeters. [Freund recommends for the attainment of the best results the use of a mechanical interrupter run at the rate of 800 to 1000 interruptions per minute.] Suitable lead masks, for protecting surfaces which are contiguous to the areas to be treated, should be used. The evidences that the exposures have been carried far enough are: The appearance of erythema or pigmentation; the blanching of the hair; and the loosening of the hair. The application of the Röntgen rays has been chiefly in four classes of affections: In hypertrichosis, for the removal of hair; in diseases of the hair and of the hair-follicles; in inflammatory diseases, like chronic eczema, and in certain specific diseases, like lupus. The author believes the agent a valuable one for removal of hair, especially in cases in which the growth is diffuse and profuse. In lupus the rays seem to have a selective action, and, employed properly, constitute a remedy of value.

Idiosyncrasy Not a Factor in X-ray Dermatitis.—R. Kienboeck,¹ who has had years of experience with the x-rays at the Vienna Röntgen Institute, announces that the effects of Röntgen treatment, the causation of dermatitis, etc., vary with the kind of tube employed and not with the individual subject. The Röntgen rays which chemically affect the sensitized plate are the essential element in Röntgen treatment; if in excess, they are dangerous. Individual predisposition varies in very narrow limits; the young react more strongly than older persons. The quantity of the rays generated and their intensity, the duration of the exposure and the distance of the tube from the tissues, must all be taken into account. He accepts as a standard exposure that which causes a simple transient alopecia, with *restitutio in integrum* in 4 to 8 weeks. Exposure producing an exudative inflammation is tenfold the standard, and exposure followed by an intractable ulceration is thirty to fifty times the normal standard. Rays of less penetrating power, such as are produced in soft and medium soft ("good") tubes, have a more intense action than those from hard tubes, first, because the latter send out less Röntgen rays, and, second, because they give a very penetrating light. He urgently warns persons occupied with the Röntgen treatment not to expose themselves in any way to the chemically active Röntgen rays. He tabulates 20 cases of x-ray injuries, all but 2 published before. One of the latter is a confrère engaged in Röntgen therapy, who acquired a "Röntgen hand," which resulted in a deep, extensive ulceration of the back of the hand. It has resisted for a year all the treatments applied. The other case is an ulceration of the hypogastrium after exposure to a "good" tube for 78 minutes in three sittings.

¹ Jour. Am. Med. Assoc., Feb. 2, 1901.

Unna has recommended, as a protective measure for operators, the application of a thick coating of zinc jelly containing 10 % cinnabar and bismuth oxychlorid. [From a practical standpoint every experience on this comparatively new topic that is recorded is interesting, especially as to the method of employing the rays.]

Therapeutic Value of the X-rays.—E. Schiff¹ states that he has had good results from the x-rays in the removal of hairs and in the treatment of lupus. In the former the tube is held 15 centimeters from the skin, and the anticathode opposite and parallel to the irradiated field. The sittings are daily at first for 5 minutes, increasing to 10 and then to 15 minutes. This must be continued for 17 to 25 days. Short sittings at intervals are then required for 5 to 8 weeks to prevent a regrowth of the hair. He has also had excellent results in the treatment of lupus. R. E. Scholefield² reports satisfactory results from the employment of the x-rays in a case of lupus on the nose and adjacent parts of the face. The patient was exposed on alternate days from June 30th to November 12th, when every vestige of the disease disappeared. The tube was fixed 5 to 6 centimeters from the skin, the unaffected parts being protected.

Treatment of Cutaneous Diseases by X-rays.—Jutassy³ reports several cases of disease of the skin treated by the x-rays. Case 1 was lupus vulgaris in a woman aged 24; exposed to an intense current at 7 sittings; total duration of exposure 4 hours. The patch of lupus became a bleeding raw surface, which healed under antiseptic dressings in a month and formed a smooth scar. Case 2 was lupus erythematosus of the nose and face in a woman aged 28; duration of disease 8 years; 7 exposures were given of a total duration of 5½ hours. The central skin of the diseased area came off in a thick layer. A second series of 6 exposures was given, total duration 3 hours. Soon after this the peripheral disease desquamated, and the face was clear and remained so for 18 months. Some small recurrences, however, occurred. Case 3 was chronic eczema of the hand in a man aged 29; duration of disease 7 years; 8 exposures were made; duration 2½ hours altogether. A crust formed on the affected skin; this healed and left the skin healthy. Case 4 was hypertrichosis of the face and neck in a woman aged 25; 10 sittings were given with a total exposure of 3½ hours. A fortnight afterward a brownish erythema appeared, and the hairs were completely shed. Two months later new hairs grew at the angle of the mouth, and a second series of sittings was given, combined with electrolysis of some of the larger hairs. A good result was obtained. Case 5 was nevus flammeus (port-wine mark) in a man aged 22; 14 hours' exposure at 10 sittings, the eyebrows, upper lip, and eyelids being protected. A pustular dermatitis resulted, which healed under simple dressings. Three months later the nevus had disappeared and was replaced by a smooth whitish scar. Unfortunately pigmentation appeared at the edge, which resisted all treatment.

¹ Brit. Med. Jour., May 5, 1900.

² *Ibid.*

³ Wien. klin. Rund., Aug. 12, 1900.

Depilation by High-tension Electric Currents.—Schiff and Freund,¹ at a meeting of the Vienna Society of Physicians, reported an interesting action of high-tension currents on the skin. When the hairy skin is exposed for 20 minutes to the silent discharge of the negative pole of a powerful Ruhmkorff coil, such as is used for the production of the Röntgen rays, the hair commences to fall out, the hair bulbs become atrophied after the third exposure, and some days later the portion of the skin which had been exposed becomes perfectly bald. The hair-follicles become red and inflamed after the first 2 exposures.

Prolonged Baths of Loueche.—E. de la Harpe,² at one time physician to these celebrated baths, states that the action of the prolonged immersion in water practised here is essentially an irritant one, and to some extent comparable to that of certain pharmaceutical applications. The indications are for sluggish cases of psoriasis, chronic eczema, lichen, ichthyosis, etc. In some cases of psoriasis, for which these baths are particularly noted, the effect is excellent, the disease sometimes remaining away for several years; but in other cases it returns soon. A second course of baths sometimes aggravates the eruption instead of improving it.

Hydrogen Dioxid.—H. E. Kendall³ states that dioxid of hydrogen injected under the epidermis produces immediate and complete anesthesia of the whole skin. He has used it for over a year in opening abscesses, cutting off redundant tissue in ingrowing toe-nails, opening the pleural cavity, and in one case the abdominal cavity. He does not think any absorption takes place, as the intercellular inflation from the gas generated seems to produce such pressure that the skin cuts like frozen tissue.

Removal of Powder Stains.—J. Neely Rhoads⁴ states that he has successfully removed from the face powder stains due to firecrackers, etc., by means of the application of hydrogen peroxid. It was used in full strength by the patient at home. Within 2 days the powder marks were all removed.

Silver Nitrate in Cutaneous Diseases.—J. C. Dunn⁵ employs in eczema silver nitrate, using it in from 1 % solution in acute forms to the solid stick in old and thickened patches. In psoriasis and acne, especially the pustular form with marked inflammation, herpes zoster, the various tinea, contagious impetigo, and lichen planus, it is as effective as chrysarobin or salicylic acid, and is often better borne. It is sedative, astringent, antipruritic, and has an alterative effect on the nutrition of the skin.

Creolin in Eczema, Psoriasis, and Other Cutaneous Diseases.—David Walsh⁶ states that the action of this drug is that of a mild, deodorizing antiseptic, while, in addition, it is a vascular stimulant and absorbent in dry skin diseases, and a nerve sedative in many sensory cutaneous disturbances. In eczema and other acute inflammatory con-

¹ Lancet, Jan. 12, 1901.

² Dublin Jour. Med. Sci., Nov., 1900.

³ Penna. Med. Jour., Jan., 1901.

⁴ Gaz. des Eaux, July 19, 1900.

⁵ Am. Med., Apr. 7, 1901.

⁶ Therapist, 1900, No. 3, p. 62.

ditions a dram to a quart of warm water may be sponged over the parts two or three times daily, followed by a dusting-powder of zinc oxid. As the inflammatory condition subsides an ointment of creolin and vaselin (1 : 16 or 48) may be employed. This is useful for the dry patches of psoriasis. As an antipruritic a dram to a pint of hot water, to which a few drams of glycerin is added, gives much relief in the pruritus of the aged.

Salicylic Acid Administered Cutaneously.—Combemale and Sigalas¹ have called attention to the fact that if salicylic acid is mixed with some oily vehicle and applied to the skin, it may be detected in the urine in 5 minutes. A favorite recipe is the following: *Acidi salicylici*, ʒiiss; *alcoholis*, ʒxiiss; *olei ricini*, ʒxxv; use locally. A tablespoonful of this mixture is poured into the palm of the hand and rubbed into the affected part for a few minutes; the part is then covered with oiled silk or rubber, and again enveloped in several thicknesses of flannel or cotton. The effect is marked. Pain disappears in a few minutes. If the oil of wintergreen be substituted for the salicylic acid, the effect will be still better.

Sapolan.—Mracek² has introduced a new remedial agent for the treatment of cutaneous diseases under the name of sapolan. It is composed of 2.5 parts of a specially extracted and fractionally distilled naphtha product, 1.5 parts lanolin, and 3% to 4% soap, for the purpose of giving it consistency. Employed in 5 cases of acute eczema, recovery took place in from 3 to 6 days; in 2 cases of chronic eczema rapid improvement occurred after its use. In 2 cases of senile pruritus the itching was immediately relieved and a cure took place in 2 to 3 weeks. It was also successfully employed in impetigo contagiosa, scabies, ecthyma, and urticaria.

A Cream of Zinc Carbonate.—Herbert Skinner³ prefers zinc carbonate to commercial calamin, which is often impure and far from desirable as an application to an inflamed surface. Zinc carbonate compounded as follows makes a useful so-called cream: *R.* Glycerin. amyli, *adepts lane hydros.*, *zinci carb.*, glycerin, of each ʒss. The first two are mixed together, then the second two, finally both together. The amount of zinc may be increased or decreased.

Gelatin Applications.—Herbert Skinner⁴ experimented with gelatin and agar-agar, but the latter was not found useful for the purpose. Gelatin is more tractable, but the author states that any formula given will depend on the kind of gelatin used, no two samples seeming alike, and that half an hour's treating will make two samples from the same lot behave differently.

Dymal.—L. Kopp⁵ has made clinical observations on a new compound, didymium salicylate, which has been termed dymal. It is an impalpable powder, without odor or taste, and is best prescribed in the

¹ Jour. Am. Med. Assoc., July 21, 1900.

² Arch. f. Dermat. u. Syph., Bd. LIII, II. 2 u. 3.

³ Brit. Jour. of Dermat., May, 1900.

⁵ Therap. Monatshefte, 1901, H. 2, S. 127.

⁴ *Ibid.*

form of an ointment. In deep ulcers of the leg, cutaneous gangrene, and in burns, even of the third degree, it has proved of value. Its action as an antiseptic is demonstrated also in a variety of infected wounds. It is of value, in the author's hands, in eczema, in psoriasis, in hyperidrosis, in ichthyosis, and in pruritus. Its comparative inexpensiveness gives it an advantage over some of the newer products used for the same purpose. It is a chemie by-product.

Amyloform.—Cipriani¹ is well pleased with the results he obtained with amyloform [a combination of starch with formalin], and prefers it to all similar drugs in incised abscesses, ulcers, wounds, burns, and purulent otorrhea. Besides being perfectly harmless and free from any compromising odor, it notably hastens granulation and cicatrization.

Epicarin.—Pfeiffenberger,² who has employed epicarin [one of the new drugs] in more than 50 children, from 1 to 14 years of age, has found it a valuable remedy in scabies and in prurigo. In the former the effect was always prompt, a cure being obtained without any irritation, even in the severest cases, after five or six inunctions. The itching disappeared in most cases after the first rubbing, and the average duration of treatment was less than 9 days. In prurigo the action of the remedy was quicker and more certain even than in scabies, the itching disappearing with the first inunction and the papules vanishing with the desquamation which followed. The following formula was used: Epicarin, 7; cret. alb., 2; vaselin, 30; lanolin, 15; axung. porc., 45.

Tobacco Soap as a Parasiticide.—Mareuse³ has found soap containing tobacco a useful remedy in a number of parasitic and other cutaneous affections. He has successfully treated 32 cases of scabies, 6 cases of tinea versicolor, 4 cases of tinea tonsurans, and a few cases of urticaria and prurigo with this soap. The method is recommended on account of its cleanliness and cheapness.

Action of Arsenic on the Skin.—H. G. Brooke and Leslie Roberts⁴ give an account of the effects of arsenic on the skin, based on the recent epidemic of beer-poisoning in the north of England. The cutaneous lesions were erythemas of various kinds, mostly diffuse, and situated on the trunk and limbs, some resembling chilblains, others erythema multiforme. The color was at first red, but afterward coppery. Herpes was common, and always unilateral. Pemphigoid eruptions occurred some time after beer drinking had ceased, and affected chiefly the hands and feet. Hyperidrosis was frequent. Pigmentation occurred both with other skin lesions and independently of them, and varied from dirty brown almost to black, the chief parts affected being the axillas, groins, and neck, the palms, soles, and face being less colored. The characteristic feature of arsenical pigmentation is the variation in tint of contiguous areas. The mucous membranes showed no coloration except a blue line on the gums. Hyperkeratosis is characteristic of arsenical poisoning, and was generally found on the palms and soles. In many cases these were covered with the so-called "arsenical warts."

¹ Monatsh. f. prakt. Dermat., Oct. 15, 1900.

³ Therap. Monatshefte, 1899, No. 12.

² Dermat. Zeit., Dec., 1900.

⁴ Brit. Jour. of Dermat., Apr., 1901.

The nails were unaffected in most cases, but in some there was increased rate of growth. The hair was unchanged. Desquamation was common. Fatty degeneration affected the walls of the small blood-vessels, and led to ecchymosis. With regard to the mode of action of arsenic, the authors state that arsenic and the other members of the nitrogen group differ from all other medicaments by the fact that their action is dynamic and due to the development of active oxygen in the tissues. [This article is a valuable contribution to the subject of arsenic poisoning, and shows that the usual gastric and intestinal symptoms may be absent.]

Naftalan in Cutaneous Diseases.—Hallopeau¹ finds that it is devoid of irritating properties, and may, consequently, be employed in acute cases. It exerts a remarkable influence upon itching, and in the seborrhoeic eczemas of children it produces a more rapid improvement than other remedies. In the eczema of adults its use has likewise been followed by favorable results. In a case of the prurigo of Hebra it gave remarkable results, producing almost instantly cessation of the itching and disappearance of the eruption. In a few cases, on the other hand, the results were not so favorable.

MISCELLANEOUS.

The Nature of the So-called Angioneuroses of the Skin.—Török² concludes, from his own investigations and those of others, that all those characteristics by which one designates certain changes in the skin as angioneurotic in contradistinction to inflammatory changes are open to criticism. A careful examination of the lesions in urticaria, erythema multiforme, and erythema nodosum led the author to include them among the simple inflammations.

Cutaneous Affections Occurring in Graves' Disease.—S. E. Dore³ directs attention to abnormal pigmentation, practically much like that met with in Addison's disease, reporting a case in which the lesions of the skin were at first looked upon as being lichen planus and then as vitiligo. [It is to be noted that in Graves' disease the pigmentation occurs chiefly as an excess of the normal pigment of the body.] Attention is also called to the existence of trophic changes in the skin and its appendages, in hyperidrosis, erythematous eruptions, edema, and in other conditions resembling eczema, acne, etc. Vasoconstrictors, especially digitalis and ergot, are considered valuable remedies.

Imperfect Urinary Excretion as Observed in Connection with Certain Cutaneous Diseases.—Bulkley⁴ presents a study of 2000 analyses of the urine of patients suffering from various cutaneous diseases. In 316 cases of eczema there were very few specimens of urine which did not show radical departures from the normal. In acne the

¹ Ann. de Dermat. et de Syph., 1900, No. 5.

² Arch. f. Dermat. u. Syph., Bd. LIII, H. 2 u. 3.

³ Brit. Jour. of Dermat., Oct., 1900.

⁴ Jour. Cutan. and Genito-urin. Dis., Mar., 1900.

analyses showed abundant evidence of disturbed assimilation. In psoriasis the acidity was high, oxalate of lime was frequently seen, and the urea was a little above the normal. Upon the whole, however, the results of the analyses were somewhat disappointing as to positive facts connected with the condition of the urine in cutaneous diseases.

Hyperidrosis.—M. D. Erlang,¹ in cases of excessive sweating brought on by the least exertion, has found pilocarpin in small doses ($\frac{1}{20}$ grain) valuable, as previously suggested by Ringer and Muorrell, as a result of their experiments. The sweating in these cases is usually associated with nerve depression.

Benzin in Seborrhea.—Leftwich² recommends benzin applied once in 5 days for the removal of dry seborrheal crusts. As the benzin leaves the hair and scalp dry, the following inunction should be used every morning: Bay rum and castor oil, of each, $1\frac{1}{2}$ ounces; tincture of cantharides, 2 drams; cologne water, 4 drams. The effect of benzin on the baldness following seborrhea is satisfactory. To conceal the odor, the author advises the addition of 10 minims of oil of geranium to each ounce of benzin. In mild cases of seborrhea the benzin is mixed with equal parts of alcohol.

Veratrin in Pruritus.—Lutaud³ recommends the external application of an ointment of $2\frac{1}{2}$ grains of veratrin to 1 ounce of lard in localized pruritus of women at the menopause. If the itching is general, the drug is used internally in the dose of $\frac{1}{180}$ grain in pill form once a day, gradually increased to 6 times a day.

Pruritus Ani et Scroti.—George Arnison⁴ recommends the use of a carbolie acid soft soap rubbed in freely every night and allowed to remain on 1 hour and then washed off.

The Treatment of Pruritus by Heat.—E. Andrews⁵ states that heat, both dry and moist, is of great value in the treatment of all forms of itching. His attention was first directed to the method by a farmer, who exposed his feet to as high a temperature as could be borne, to relieve the itching of chilblains. Each application was followed by great relief, and usually two or three effected a cure. There is a certain periodicity in all forms of pruritus. For anal pruritus the application of hot compresses, changed every 2 minutes until the itching disappears, is recommended. In scrotal pruritus relief is obtained by the use of very hot applications, which can be evenly made by having the patient sit in a tub of water.

SYPHILIS.

Syphilis and Urinary Excretion.—Patoir,⁶ who has studied some of the indirect effects of syphilis, finds that syphilitic anemia plays an important rôle in the alterations occurring in some of the organs. This general alteration in nutrition seems to be especially reflected upon the kidneys. There seems to be a form of diffuse inflammatory reaction

¹ Lancet, June 22, 1901.

² Jour. de Méd. de Paris, No. 11, 1900.

³ Clin. Rev., May, 1900.

⁴ Brit. Med. Jour., No. 2088, 1900.

⁵ Lancet, Nov. 17, 1900.

⁶ Arch. Gén. de Méd., Apr., 1901.

peculiar to these organs, which may proceed to actual acute nephritis. In other cases there is albuminuria without any marked clinical evidence of inflammation of the kidneys. In about half the cases of syphilis there is evidence of some kidney lesion, which may be present during a period of activity, secondary or tertiary. During the eruptive period albumin, sugar, and urobilin appear, and the total amount of urea is increased. These changes are most marked in young subjects. In elderly subjects the tendency of syphilis is to reduce the quantity and specific gravity of the urine. When syphilis becomes dormant, the renal excretion returns to the normal average, except in some cases when the attack has been unusually severe, and when the patient has suffered from more or less intense anemia. In such cases the renal excretion may show permanent damage. On the other hand, in some benign cases there is no alteration in the urinary excretion.

An Unusual Symptom in Secondary Syphilis.—Skirving¹ calls attention to an unusual symptom observed in several cases of secondary syphilis, viz., marked itching of the fauces. In 2 cases the itching was severe, the desire to scratch the throat being most urgent. One of these patients was accustomed to obtain relief by swallowing crusts of bread, while the other scratched his tonsils with his finger. The itching occurred over the tonsils, the pillars of the fauces, and the posterior part of the sides of the tongue; other parts of the mouth and throat were unaffected. In the 2 cases specially referred to the itching began about 8 weeks after the appearance of the chancre.

Albuminuria in the Early Stages of Syphilis.—Bacon² finds that there is no clinical difference between the Bright's disease resulting from syphilis and the ordinary forms. The real nature of the syphilitic variety would often remain undiscovered were it not for the coexistence of more manifest syphilitic lesions and the benefit sometimes derived from specific treatment. He believes that many cases pass unnoticed owing to the frequent absence of other signs of syphilis. The derangements, functional and organic, of the urinary apparatus are to be attributed to a primary alteration of the blood, particularly of its globules and albuminoid principles. But they may also be due to the passage of the microorganisms of syphilis through the kidneys producing a sort of traumatism of the arterial walls and cellular elements, thus setting up an infectious nephritis.

The Pyrexia of Syphilis.—Bassett-Smith³ reports the case of a man, 25 years of age, who was admitted to the Royal Naval Hospital, Haslar, for malaria; examination of the blood, however, showed no evidence of this disease, but revealed a relatively great increase of lymphocytes as distinct from the polymorphonuclear leukocytes (neutrophils). There was a great reduction of the red cells without nucleated forms, but only a slight total increase of the white cells. These blood-changes, the marked anemia, epistaxis, and slight enlargement of the glands in the groin led to a diagnosis of early lymphatic leukemia.

¹ Brit. Med. Jour., May 4, 1901.

² Mass. Med. Jour., Apr., 1901.

³ Lancet, Dec. 22, 1900.

The variations of temperature were remarkable, there being as much as 7 degrees difference between the morning and evening temperatures ; but there were no rigors and scarcely any constitutional symptoms. The patient was treated with iron, arsenic, and digitalis for 10 weeks, and for a short time with mercury with chalk, but the blood showed the same characters throughout, there being an extraordinary abundance of blood-plates. Later, potassium iodid and bark were given, as there was an old history of syphilis ; in 3 days the temperature fell to normal and never rose again. The author believes that many cases of indefinite fever are of this character. He also calls attention to the fact that the iodids were more efficacious than mercury in the treatment of this fever. [This is a subject of more than ordinary importance, and one to which but little attention is paid in text-books. There is no doubt that the real character of many, if not most, of these cases is not recognized.]

Affections of the Heart in Syphilis.—Rosenthal¹ believes that syphilis of the heart occurs more frequently than is commonly supposed, although it is not a frequent affection. Contrary to the current belief that it is most frequent between the sixth and tenth years after infection, Rosenthal observed it oftenest between the second and fourth years. The structure primarily attacked is the myocardium, the endocardium and the pericardium suffering only secondarily. Gummous and interstitial inflammation usually occurs simultaneously. Gummous myocarditis attacks by preference the ventricular walls, occurring as single or multiple, pigeon-egg-sized gummas which undergo fatty degeneration or caseation. The pericardium is rarely affected alone. Syphilitic angina pectoris which is accompanied by arrhythmia, palpitation, and asthma, without especial muscular alterations, is due to changes in the neuromuscular apparatus—*i. e.*, the cardiac ganglia. Conditions predisposing to luetic heart-disease are alcoholism, preexisting valvular defects, renal and vascular disease, diabetes, the tobacco habit, and severe bodily labor. No special symptomatology accompanies syphilitic myocarditis. At times it remains latent throughout its entire course, which may be very lingering, with premonitory symptoms, such as pain and pressure in the region of the stomach, weakness, feelings of fear, and occasional intermission of the pulse. In cardiac affections of a doubtful nature in persons in the prime of life syphilis should always be thought of. In the treatment, in addition to mercury, iodin should be used ; not the iodid of potassium, but the tincture of iodin up to 30 drops three times a day. Iodipin may be given hypodermically.

Disease of the Myocardium in Congenital Syphilis.—Berghinz² reports 2 cases which illustrate the arterial and vascular lesions which may be produced by syphilis in infants, and which may result in death in those apparently healthy. One patient, an infant 18 months old, while apparently in good health, suddenly developed paroxysmal dyspnea, cough, and intense cyanosis. The case ending fatally, the autopsy revealed characteristic vascular lesions, such as occur in the subjects of congenital

¹ Berlin. Klin. Woch., No. 47 u. 48, 1900.

² Gaz. degli Osped., June 24, 1900.

syphilis, affecting especially the myocardium. No history of syphilis in the parents was obtainable; but in the second case, which presented the same group of symptoms and ended fatally, the child's father presented an undoubted history of syphilis. The author refers to an article published elsewhere containing a summary of the postmortem appearances found in 22 cases of hereditary syphilis, in which it appeared that syphilis affected the ganglia of the heart, causing proliferation of the perivascular connective tissue of the blood-vessels in the cardiac walls, which eventually produced arteriosclerosis and death. Many forms of cerebral palsy (hemiplegia and monoplegia) may also result from cerebral arteriosclerosis when the latter occurs in the fetus *in utero*, the results appearing as various forms of paralytic idioey and imbecility.

A Peculiar Corpuscle in the Blood of Syphilitics.—According to Losterfer,¹ peculiar corpuscles are present in the blood of those the subjects of syphilis. They appear soon after the initial lesion, but before the secondary eruptions. After 3 days they begin to disappear, particularly if mercury has been administered, and after 20 to 25 inunctions they can no longer be found. They are small round bodies the size of the granules of the blood, with a peculiar luster. They are not present in the blood of healthy persons, nor in those with diseases other than syphilis. They are not stainable with the ordinary dyes, but become more distinctly visible upon the addition of acetic acid. These observations have been confirmed by Paltauf.

The Relation of Buccal Leukoplakia to Syphilis.—Fournier,² who has studied for a long time the relationship existing between leukoplakia and syphilis, concludes concerning it as follows: Leukoplakia is an affection confined almost exclusively to men; out of 324 cases only 5 were in women. Without doubt the two chief causes of the disease are tobacco and syphilis. Even when it occurs in syphilitic subjects with syphilis as the undeniable cause, it is absolutely refractory to specific treatment. It belongs among the affections which are at the present time named parasyphilitic.

Syphilis as a Nonvenereal Disease.—Bulkley³ considers the various methods of acquiring nonvenereal syphilis under three main divisions: (1) Those relating to domestic and industrial life; (2) those relating to the nourishment and care of children; (3) those relating to professional pursuits in the care of the sick. Under the first division he refers to the many instances in which the disease has been transmitted by knives, forks, spoons, cups, by tobacco pipes and cigars, and other articles in common use in domestic life; by clothing and toilet articles, and by implements used in various occupations. Under the second division are considered the many cases of syphilis acquired by suckling syphilitic infants or from contact with the secretions of such infants. Under the last division are included the cases in which physicians, surgeons, and midwives have been infected in the discharge of their profes-

¹ Lancet, June 16, 1900.

² Gaz. Hebdom. de Méd. et de Chir., No. 91, 1900.

³ Jour. Am. Med. Assoc., Apr. 6, 1901.

sional duties ; those in which syphilis has been given by breast-drawing, tattooing, circumcision, vaccination, etc. ; and, lastly, those in which syphilis has been transmitted through the operator as a medium, as in skin-grafting, vaccination, wet-cupping, through dental instruments, eustachian catheters, etc. The author believes that the time has come to place syphilis under the control of health officers, and to make it criminal to transmit it wittingly.

Syphilis Aggravated by an Intercurrent Variola.—DuCastel,¹ at a séance of the Société Française de Dermatologie et de Syphiligraphie, presented a young girl with a syphilis of 18 months' duration, who had suffered from an intercurrent attack of mild varioloid. During the evolution of the variola nothing special was observed, but when convalescence was established the syphilis assumed a grave form ; the body became covered with numerous crusted lesions and severe ulcerations, especially upon the lower limbs.

The Justus Test in Syphilis.—Christian and Foerster,² who have made a study of this test in 29 cases of syphilis, conclude as follows concerning its diagnostic value : In the diagnosis of doubtful ulcers it is of no value. It seems to occur in a certain proportion of cases of acute secondary syphilis, when it appears to be a symptom of the disease and can in no sense be considered a true test, as the diagnosis is in such cases already complete. As a test it is not reliable, occurring as it does in conditions other than syphilis.

Iodipin in Syphilis.—Radestock³ calls attention to a new iodine preparation, iodipin, which is a combination of iodine (10%) and oil of sesame. The compound, which is said to be stable, is employed in tertiary syphilis instead of potassium iodide. It is claimed that it does not produce marked iodism nor does it disturb the stomach, while its effects are more lasting than those produced by the iodides. It may be given in doses of 40 to 50 grams, or it may be used in inunctions. In 2 cases, one of acquired, the other of hereditary syphilis, treatment with iodipin was successful after the ordinary methods had failed. Klingmüller⁴ has also obtained good results from the use of the drug, and advises hypodermatic injections of a 10% solution in doses of 20 cc. every other day. Holzhauser⁵ finds that gummas are absorbed with surprising rapidity when this drug is administered. He employs it hypodermatically in an oily 25% mixture. He has never seen pain or suppuration follow its use in this manner.

Treatment of Syphilis by Inunctions with Calomel Ointment.—Kazandjief⁶ recommends inunctions with the following ointment in the treatment of syphilis : Calomel by vaporization, 4 grams ; vaselin, lard, àà 2 grams ; oil of turpentine, 0.80 gram. This quantity is to be used at each inunction, which is to be performed in the following manner : The ointment is spread over as large an area of the skin as possible,

¹ Ann. de Dermat. et de Syph., Jan., 1901.

² Univ. Med. Mag., Nov., 1900.

³ Therap. Monatshefte, 1899, S. 551.

⁴ Berlin. klin. Woch., 1899, S. 540.

⁵ Therap. Monatshefte, Aug., 1900.

⁶ Thèse de Paris, 1900 ; Gaz. Hebdom. de Méd. et de Chir., July 1, 1900.

enveloped in flannel, and allowed to remain 24 hours; a new region is selected at each application. That the mercury is absorbed is shown by its presence in the urine, by its effect upon the gums, and by its therapeutic effects. Irritation of the skin does not follow its use, except upon parts thickly covered with hair; here a slight follicular inflammation may occur. These inunctions are very efficacious in the cutaneous manifestations of syphilis, especially in the papular and pustular eruptions. The author has found that in the majority of cases 15 days is sufficient to produce the disappearance of lesions of moderate severity. While a very useful method of treatment, it is not the method of choice in severe cases because its action is at times very slow. [This method of mercurial inunction is especially to be recommended in cases of moderate severity because of its cleanliness as compared with inunctions of the ordinary mercurial ointment.]

A New and Tolerable Form of Administering Mercury.—Ayres¹ reports 65 cases of syphilis treated with mereurol, a nucleid of mercury, and from the marked improvement shown by many of the cases he considers it a remedy of great value. His conclusions are that it causes less gastrointestinal disturbance than other preparations of mercury used internally; that it controls skin eruptions and pains much more effectively than other mercurials, and is quite as effective in controlling affections of the mucous membranes. It may be taken in pill form. [We confess ourselves unable, after reading the report of these cases, to see that this new preparation of mercury possesses any real advantage over some of the old and well-tried mercurials, such as, *e. g.*, mercury with chalk.]

The Treatment of Syphilis.—Heuss² considers treatment in the initial stages of syphilis useless, and even harmful. Mercurialization is not a preventive because mercury is a specific only for the symptoms and not for the syphilitic poison. Excision of the primary lesion, even in the earliest stages, cannot be recommended. Only in those cases in which the symptoms are very acute, or in which iritis or rapidly spreading ulceration is present, should mercurial treatment be employed in the first stage. Heuss does not advocate the chronic-intermittent treatment recommended by Fournier, since it impairs the general health and does not prevent recurrences or tertiary symptoms. Energetic mercurial treatment in the second stage is advocated, to be repeated if the symptoms recur. [While we agree with the author that the administration of mercury in the primary stage of syphilis does not prevent the appearance of the disease, we believe that the long-continued use of this drug, properly watched, offers the only possibility of a cure. If carefully watched, the effect upon the general health of such treatment need not be feared.] Jonathan Hutchinson³ believes syphilis to be a milder disease than formerly. While mercury is the antidote, it is not absolutely necessary, since spontaneous recovery may occur. Excision of the initial lesion, when performed early—within the first

¹ Phila. Med. Jour., Nov. 10, 1900.

² Correspondenzbl. f. Schweiz. Aerzte, No. 6, 1901.

³ Treatment, June, 1900.

week or 10 days—has a tendency to make the course of the disease milder. It is not wise to wait for the appearance of secondary symptoms before administering mercury. The continuous administration of this drug is the most efficient method of treatment, the continuous being distinguished from the so-called symptomatic administration, in which the drug is only given when symptoms of the malady are present. Hutchinson prefers giving mercury by the mouth to inunction or hypodermatic injection, using a grain of gray powder in pill, with $\frac{1}{4}$ grain of opium, three times a day during the first week, and later increasing it to four, then five times a day. Treatment is continued for a year. [We cannot agree with Hutchinson that mercury should be given before the appearance of secondary symptoms. We believe that these should always be waited for before beginning mercurial treatment.] Blaschko ¹ has so often been convinced in practice of the uselessness of the so-called chronic-intermittent mercurial treatment, as advocated by Fournier and Neisser, that he administers mercury only when syphilitic symptoms are present. Nor does he believe that tabes, progressive paralysis, and other late symptoms are prevented by the continued administration of mercury in the earlier stages of syphilis. Intramuscular injections of mercury salicylate are for the author the standard treatment of syphilis, which should not be reserved for severe cases only.

Calomel Injections in Syphilis.—Fournier ² regards injections of calomel as affording the best means of producing a powerful effect upon syphilis; but they are not to be used in a routine way, but only in severe cases, such as syphilis of the central nervous system, phagedena, chronic palmar and plantar syphilids, iritis, ulcerating tuberculous syphilids, glossitis, and tertiary syphilis of the larynx and lungs. In making the injection the needle should be thrust deeply into the gluteal muscles, care being taken not to enter a blood-vessel, since there is danger of pulmonary embolism should this occur. Sublimed, and not precipitated, calomel should be used. It should be thoroughly washed in boiling alcohol and suspended in sterilized olive oil. The average beginning dose is $\frac{3}{4}$ grain, which, if well borne, may be increased to $1\frac{1}{2}$ grains. The injections may be made once a week or every 10 days, from four to six being usually sufficient. They are not always, however, followed by favorable results, and are sometimes dangerous. The chief untoward effects are stomatitis, gastroenteritis, local reaction, and pain.

The Nitrite Treatment in Syphilis.—Browning ³ employs the nitrites in syphilis because of the tendency of this disease to produce arterial changes, usually a narrowing of the lumen of the vessels, either by organic change or by vascular spasm. His greatest experience with this form of treatment has been with syphilitic disease of the cerebral arteries, and the immediate results have been eminently satisfactory. In cases of brain syphilis with melancholia with suicidal tendencies the

¹ Berlin. klin. Woch., Jan. 14, 1901.

² Rev. de Therap., Nov. 1, 1900.

³ Med. News, Dec. 29, 1900.

nitrites are very useful on account of their buoying qualities. In the so-called parasyphilitic affections they are of little service. In the early stages of progressive dementia they form a very useful adjunct to other forms of treatment. In the glycosuria of old syphilitics the nitrites are valuable. In the common spastic form of spinal syphilis they are particularly useful, but the author has not seen any very striking results in tabes. In gumma of the brain and cord the nitrites aid materially to obtain the effect of mercury and the iodids. Specific troubles other than those of the central nervous system, when accompanied by pain, may also be favorably influenced. These remedies are indicated in all syphilitic disease of the arteries, in all syphilitic diseases attended by pain, in all syphilitic brain affections, and especially the later and hereditary disorders; but such other specific remedies as may be indicated should also be immediately employed. Nitroglycerin is the most useful of the various nitrites, although soda nitrite and erythrol tetranitrate may also be used. Administration by the mouth is greatly preferable to hypodermatic injections, since a continuous action is desirable.

MATERIA MEDICA, EXPERIMENTAL THERAPEUTICS, AND PHARMACOLOGY.

By REYNOLD W. WILCOX, M.D., LL.D., AND A. A. STEVENS, A.M., M.D.,
OF NEW YORK. OF PHILADELPHIA.

[No one can read the following review of therapeutic progress during the past year without being impressed by the evidence of increased interest in the subject as shown by both the quantity and the quality of the literature. Not only has the number of periodicals devoted to this subject been increased, but the older journals are devoting more space to it. The brilliant success attained by the American Therapeutic Society at its meeting in Washington last May is an earnest of continued good work by representative practitioners. American medicine is and has been practical to a high degree, and whatever may insure a lower mortality in disease and a more speedy and comfortable recovery appeals to the physician. From this standpoint the year has been eminently satisfactory.]

Acetanilid.—Wescott¹ reported 7 cases of poisoning in infants from the external use of acetanilid. Since then several additional cases have been recorded. Manasses² reports 2 cases, one in an infant of 6 weeks, the other in a child of 2½ years, in which the use of the drug as a dusting-powder on wounds caused poisoning, which was manifested by cyanosis, subnormal temperature, feeble and shallow respiration, dilated pupils, weak, rapid heart, cold extremities, and marked prostration. Both patients recovered under stimulant treatment. Stewart³ reports similar cases. Notwithstanding the fact that all the patients recovered, except one, an infant 4 days old, Wescott's conclusions seem justified that acetanilid as a desiccant dressing for young children, even when there is an insignificant exposure of the derm, is distinctly dangerous to life. Summers⁴ reports a peculiar instance in which 4 grains of acetanilid, repeated in 30 minutes, caused cyanosis, partial loss of consciousness, and grave collapse. Under free stimulation and artificial respiration practised for nearly 2 hours the patient rallied, but relapsed and nearly died. Renewal of the treatment was ultimately followed by recovery. There was no cardiac lesion, and the patient had many times previously taken the drug in much larger doses without ill effects. Earp⁵ reports another instance of poisoning, in a woman, aged 35 years, from the in-

¹ Pediatrics, June 15, 1899.

² Med. Rec., June 22, 1901.

³ Phila. Med. Jour., Sept. 7, 1901.

⁴ N. Y. Med. Jour., vol. LXXI, p. 426.

⁵ Merck's Arch., June, 1901.

gestion of 12 grains within a period of 3 hours. [These instances of poisoning should warn the profession that many of the loudly advertised mixtures containing this drug are equally dangerous and have been followed by serious results.]

Acetopyrin.—This is a compound of acetyl-salicylic acid and antipyrin. It is a crystalline powder, soluble with difficulty in cold water, but more readily soluble in warm water, and easily soluble in alcohol. Winterberg and Braun ¹ have employed it in about 100 cases, and have found that it has advantages which render it superior in rheumatism to sodium salicylate and other derivatives of salicylic acid. They claim that it does not depress the heart.

Adrenalin.—[See also Suprarenal Extract.] This substance, which Takamine ² has succeeded in isolating from the suprarenal gland, has almost completely displaced preparations of dried gland as a local vasoconstrictor. It is a light, white, microcrystalline substance, showing a slightly alkaline reaction. It is sparingly soluble in cold water, but readily soluble in hot water, and in weak acids. A fraction of 1 drop of a 1 : 10,000 aqueous solution of adrenalin blanches the conjunctiva within 30 to 60 seconds. When given intravenously, the drug exerts a powerful influence upon the general muscular system, but especially upon the heart and blood-vessels, resulting in an enormous rise of blood-pressure. According to Takamine, it is 1000 times stronger than suprarenal extract, and when locally applied it is the most powerful astringent and hemostatic known. It is nonirritating, nonpoisonous, and nonecumulative. As the result of experiments on dogs, Reichert ³ finds that adrenalin raises the arterial pressure, in part through direct stimulation of the heart, and in part through vasomotor stimulation, both centric and peripheral; that it increases the respiration-rate by stimulation of the respiratory center; that it increases the rate and force of the heart by its direct stimulant action on the heart; and that it increases general metabolism and body-temperature. He concludes that the prompt and positive action of the drug upon respiratory movements, heart, arterial pressure, general metabolism, and body-temperature justifies the belief that it will be found of value in morphin-poisoning, in failure of the circulation, in the prevention of collapse in anesthesia, and in allied conditions. It is probable, owing to its powerful local vasoconstrictor action, that abscesses will be caused by its subcutaneous injection. Mayer ⁴ finds that solutions of adrenalin slowly change color, but that this change does not affect the action of the drug. The addition of a small amount of chlorotone to the solution keeps it clear and retards the color changes. He believes that adrenalin solutions supply every indication in rhinologic practice, for which the aqueous solutions of the extract were used; that they can be used in sterile form; that they remain unchanged for a long time; and that a solution of 1 : 1000 is all-sufficient for operative cases, and 1 : 5000 or 1 : 10,000 for every

¹ Wien. klin. Woch., Sept. 27, 1900.

² Therap. Gaz., Apr., 1901.

³ Univ. of Penna. Med. Bull., Apr., 1901.

⁴ Phila. Med. Jour., Apr. 27, 1901.

purpose of local medication. Ingals ¹ has also found adrenalin an effective astringent in acute and subacute inflammations of the nose and larynx, and in epistaxis. He has found that a 1 : 5000 solution before operation acts as powerfully as a solution of the desiccated glands containing 30 grains to the ounce. Reynolds ² concludes, from an extensive experience with adrenalin in diseases of the eye, ear, and nose, that it is a powerful hemostatic, acting generally within 1 minute from the time it is applied; that its effects persist from 20 minutes to 4 hours; that it promptly relieves ciliary pain in all forms of keratitis, iritis, and even the cyclitis of glaucoma; that it lessens intraocular tension in glaucoma; that it favorably influences many corneal opacities; that in many cases of tinnitus aurium prompt and sometimes lasting benefit follows the introduction of a drop of the adrenalin solution through the eustachian catheter into the middle ear; that it renders operations in the nasal passages nearly or quite bloodless, and does not, as some claim, predispose to secondary hemorrhage, but has a contrary effect; and that a 1 : 1000 solution of adrenalin in sodium chlorid may be relied upon to relieve any case of epistaxis. Solis-Cohen ³ has himself experienced great relief in "rose cold" from the topical use of adrenalin solution, applied on cotton wad or as spray, in the proportion of 1 : 5000. He advises thorough cleansing of the nares with a mild alkaline detergent solution before using the adrenalin, and subsequently an oily spray to protect the surface from irritation. [We are inclined to dissent from the opinion that solutions of changed color are as effective as fresh ones. In spite of various suggestions as to preservatives, we have found none satisfactory, and insist upon the use of fresh solutions only].

Alcohol.—The most conflicting opinions continue to be expressed upon the food-value of alcohol. Kassowitz,⁴ after reviewing the metabolism work that has been done on the influence of alcohol, decides that alcohol can in no sense be considered a nutrient, apparently basing his opinion upon the belief that a poison is always a poison, irrespective of its dose. Laitenow ⁵ has experimented on no fewer than 342 animals, with a view to determining whether alcohol increases susceptibility to infection or not. To birds it was administered in 25% solution, and to some of the dogs in 50% solution. As infecting agents cultures of anthrax, tubercle, and diphtheria bacilli were employed. He found that in all cases, without exception, the effect of the administration of alcohol was to render the animal distinctly, sometimes markedly, more susceptible to infection than were the control animals. Gruber ⁶ concludes from a careful collection of the many experiments made upon various animals, that alcohol **weakens the resistance of the organism**, and so favors the action of invading microbes, and that, therefore, the drug should never be used in infectious diseases unless the patient is near collapse, when life may be prolonged by its use. Bertarelli ⁷ has corroborated Epstein's conclusions

¹ Jour. Am. Med. Assoc., Apr. 27, 1901.

² Am. Med., July 6, 1901.

³ Am. Med., Sept. 7, 1901.

⁴ Deut. med. Woch., Aug. 16, 1900.

⁵ Brit. Med. Jour., 1900, vol. II, p. 855.

⁶ Wien. klin. Woch., May 9, 1901.

⁷ Rev. d'Hyg., Jan., 1900.

concerning the value of alcohol as a **disinfectant**. The best results were obtained with alcohol of 50 % strength, the power diminishing with departures in both directions from this dilution. The action of any dilution on spores was practically nothing. Alcoholic solutions of corrosive sublimate, carbolic acid, chromic acid, and silver nitrate were more active the less the alcoholic strength. Braatz ¹ gives the following reasons why alcohol is valuable in disinfecting the hands: It absorbs the air held in the pores of the skin; before a liquid can reach the skin this air must be absorbed; alcohol dissolves ten times more air than water, thereby reaching the germs better than any antiseptic dissolved in water. Ahlfeld ² is of the opinion that as a disinfectant for the hands a 96 % solution of alcohol is preferable to the tincture of green soap—a 46 % solution of spiritus saponis. Winternitz ³ has had great success in the treatment of **herpes zoster** by the application of compresses of 6 or 8 folds of absorbent gauze wet with absolute alcohol. The compress is covered with some impermeable material, and this in turn with a layer of cotton, and the whole firmly bandaged in place. The dressing is renewed in 24 hours. The neuralgic pains ceased immediately or within a few days, and the vesicles disappeared without ulceration.

Amyl Nitrite.—Cordero ⁴ advises the use of amyl nitrite to lessen the disturbances occasioned by cocain in spinal anesthesia. Amyl nitrite has the opposite effect to cocain on the vessels, and for this reason the drug is suggested. Schilling has also recommended amyl nitrite in cocain-poisoning.

Antiplague Serum.—Brownlee ⁵ reports 9 cases of plague treated with Yersin's serum. Five of the cases ended in recovery and 4 proved fatal. He emphasizes the fact that the subcutaneous administration of the serum produces little effect, while the intravenous injection of the remedy has a pronounced therapeutic influence. He remarks that the doses employed (20 cc.) were probably too small, and that, should an opportunity to use the serum again present itself, he would employ an initial dose of 60 cc. or more intravenously. The author believes that a dose of 10 cc., while in no way affording protection, probably induces a certain degree of immunity. Lustig and Galeotti ⁶ claim for their serum, which is obtained by treating the horse with a nucleoproteid obtained from dead plague microbes, greater curative power than that possessed by either Yersin's or Roux's serum. In India, where the disease has been most virulent, the rate of recovery under Lustig's serum in 475 cases was 39.36 %, against 20.6 % of recoveries in 5952 cases treated during the same time without serum. According to the authors, Yersin's serum did not reduce the plague mortality (80 %) in India, although it apparently did so in Oporto, where the disease was of a milder type. According to Choksey, ⁷ Lustig's serum gave a recovery-rate of 59.37 % in 32 patients treated in

¹ Münch. med. Woch., Dec. 4, 1900.

² Centralbl. f. Gynäk., Sept. 5, 1900.

³ La Semaine Méd., Apr. 3, 1901.

⁴ Gaz. degli Osped., June 16, 1901.

⁵ Lancet, Aug. 17, 1901.

⁶ Brit. Med. Jour., Jan. 26, 1901.

⁷ Tr. of Bombay Med. and Phys. Soc., Sept., 1900.

private practice. He recommends subcutaneous injection of from 60 cc. to 100 cc. in adults, the total quantity for a cure varying from 150 cc. to 300 cc., depending on the strength of the serum and the severity of the case. The serum is without deleterious effect, even when administered to healthy subjects.

Antipneumococcus Serum.—Wilson and Page ¹ report 17 cases of croupous pneumonia treated with serum, with a mortality of 35.3 %. The authors have collected from all sources 162 cases treated with serum, of which 27 resulted in death, a mortality of 16.6 %. They believe that the extreme variations occurring in the course of the attack and in the mortality of croupous pneumonia, as modified by the age of the patient, his habits, previous health, antecedent diseases and complications, render general statistics wholly unreliable in determining the efficacy of any plan of treatment. The authors conclude that their observations, based upon 36 cases (18 previously reported), have not encouraged them to continue the serum treatment.

Antipyrin.—Lawrow ² finds that antipyrin appears in the urine in the form of a double glycuronic acid, in which antipyrin itself is probably held in the form of an oxyantipyrin. Kerley ³ has made a study of drug values in the treatment of pertussis. He enumerates the various agents tried in 752 cases, and concludes that the drugs of value are quinin, antipyrin, and bromids. Antipyrin had been used in 60 cases, and had controlled the paroxysms better than any other drug employed, and caused only a trifling depression if administered with ordinary care. The combination of bromids with antipyrin had been used in 60 cases, with better results than from one or other of these drugs independently. For a child between 2½ and 4 years of age, 2 grains of antipyrin and 3 or 4 of bromid should be given every 2 hours for 12 hours, and then discontinued for 10 hours before being resumed. Linossier ⁴ believes that in doses of from 45 to 60 grains a day antipyrin gives results in rheumatism identical with those obtained from salicylates, and with much less disagreeable by-effects. He is also convinced that antipyrin has a distinct effect in lessening cardiac complications. Spaeth ⁵ has used as a styptic, with good results, a mixture of antipyrin and salol in 70 cases of uterine hemorrhage. Equal parts are liquefied by heating in a glass vessel, a cotton applicator is dipped in the solution, and the uterine cavity is swabbed out with it 3 or 4 times at intervals of from 2 to 4 days. The solution is purely hemostatic. Hemorrhages from inflammatory conditions of the adnexa, subinvolution, and abortion were controlled in 80 % of the cases. The treatment was unsuccessful in uterine polyps and intramural fibroids.

Antistreptococcus Serum.—The efficacy of this serum still remains unproved; however, as it rarely, if ever, does harm, it is advisable to employ it in cases of general sepsis, but not to the exclusion of better known therapeutic measures. Walton ⁶ reports 2 cases, one of

¹ Therap. Month., July, 1901.

³ Pediatrics, May 1, 1900.

⁵ Centralbl. f. Gynäk., 1901, No. 19.

² Zeit. f. phys. Chem., 1901, Bd. xxxii.

⁴ Rev. de Therap., 1901, vol. lxxviii.

⁶ Lancet, Oct. 20, 1900.

puerperal sepsis, another of ulcerated sore throat, in which the serum was used with satisfactory result. Richardson¹ is convinced that a patient with erysipelas under his care could not have lived 24 hours without it. Macmillan² also reports a severe case of erysipelas in which the remedy was employed successfully. Campbell³ administered antistreptococcus serum with negative results to a patient suffering from pulmonary tuberculosis, who had symptoms suggesting pyogenic infection. On the other hand, Shively⁴ cites a case of tuberculosis with mixed infection in which injection of Marmorek's serum was followed by marked improvement. He states, however, that in other cases no improvement was seen, or the benefit was slight and of short duration.

Antitoxin of Diphtheria.—Richardière⁵ reports a series of 1778 cases of diphtheria cared for at the Hôpital Trousseau, the diagnosis having been confirmed in every case by bacteriologic examination. Treatment consisted in injections of Roux's serum (10 cc. up to 1 year; 20 cc. above two years). Locally, lavage of the throat was made with solutions of calcium permanganate 1 : 4000. There were no grave accidents imputable to the serum. Eruptions occurred in 198 cases, in from 2 to 15 days after the injection of serum. Articular complications appeared in 15 cases, most often arthralgie only, exceptionally inflammatory. Primary toxicity seemed to be rebellious to all treatment; secondary toxicity could be prevented by early employment of serum. The gross mortality was 15.7%. Excluding moribund cases (dying within 24 hours after admission to hospital), the mortality was only 11.5%. In 1115 nonoperative cases the death-rate was 5.5%. On the other hand, the mortality of the laryngeal cases requiring operation was 27%. Baginsky ("Nothnagel's System") reports 1500 cases in hospital and private practice, and says that the fall of mortality under serum treatment has been from 41% to 8% or 9%. Cases injected on the first day give a death-rate of from 1.07% to 2.7%. Cases injected upon the second day give a mortality of from 5.7% to 14.1%. Shurley⁶ reports a second series of 100 operative cases treated with antitoxin and intubation. Of the first series, 69 patients recovered and 31 died. Of the second series, 80 recovered and 20 died. The mortality of all cases under 3 years was 29.2%; over 3 years, 12.1%. Of the fatal cases in the second series, 10, or one-half, were *in extremis* at the time of the operation. The average time of operation was the third day of the disease. The total amount of serum given to the second hundred was 210,700 units, an average increase over the dosage of the first series of 443 units per case. No secondary tracheotomies were performed. No immunized child developed the disease. According to Steele,⁷ symptoms of heart weakness, albuminuria, and paralysis are probably considerably more common since the beginning of antitoxin

¹ Brit. Med. Jour., No. 2062, 1900.

² Brit. Med. Jour., Oct. 20, 1900.

³ Rev. Mens. des Mal. de l'Enf., Sept., 1900.

⁴ Brit. Med. Jour., Mar. 9, 1901.

⁵ Phila. Med. Jour., Dec. 1, 1900.

⁶ Therap. Gaz., Dec. 15, 1900.

⁷ Proc. Phila. Co. Med. Soc., May, 1901.

treatment than in the preantitoxin days. This greater frequency in visceral complications is explained, according to the author, by the fact that, owing to the reduced mortality, numbers of patients recover that would have died in the preantitoxin days; but that these patients will suffer from visceral complications resulting from the necrosis-producing toxin is self-evident. Steele believes that there is a tendency to use larger doses than formerly, and that one injection given early and containing 1500 to 2000 units is usually sufficient to control the disease, and second injections are not so frequent as formerly. McCullom¹ makes a plea for large doses. He recommends a minimum initial dose of from 4000 to 6000 units, and in serious cases this is to be repeated at 4-hour intervals until the symptoms are controlled. In many instances he uses 60,000 to 70,000 units. Park² reports a series of 93 cases of diphtheria treated with antitoxin in the Willard Parker Hospital, New York City. Of these, 14 patients died, or 15%. He formulates the dose of antitoxin as follows: In very mild cases, 1000 to 1500 units for the first dose; in very severe cases, 4000 to 5000 units for the first dose; in moderately severe cases, 2000 to 3000 units for the first dose; and in laryngeal cases, 2000 to 5000 units, according to their severity. For children under 1 year the author recommends about one-third less than for older children and adults. He believes that the amount of swelling about the throat and the extent and nature of the membrane are better guides to dosage than the general condition. If at the end of 12 hours after the injection the inflammation is advancing, or if at the end of 18 hours the inflammation has not clearly begun to subside, a second dose of antitoxin should be injected. In a few cases a third dose is required at the end of from 24 to 36 hours. The serum is of no avail for the sepsis and bronchopneumonia of the worst cases. It is better to give too much antitoxin than too little, although moderate doses seem to accomplish as good results as very large ones. Barbier and Lobligois³ are of the opinion that in severe epidemics of diphtheria ordinary doses of antitoxin have but little effect. Either the disease is not benefited, or temporary relief follows the injection, with a recurrence of symptoms later. Out of 325 cases treated at the Trousseau Hospital, membranes persisted over 3 days after the injections in 50 patients; in a few cases they persisted until the twelfth day. Injections of from 10 cc. to 40 cc. were given on admission, repeated upon the second or third day. Méry⁴ stated that in diphtheria secondary to measles large injections are also necessary to produce any effect. At a meeting of the Société de Pédiatrie,⁵ held June, 1901, a resolution was adopted affirming that preventive inoculations present no serious dangers and confer immunity in the great majority of cases for some weeks, and recommending their employment in children's institutions and in families in which scientific surveillance cannot be exercised. Netter stated that he had collected 32,484 observations of prophylactic injec-

¹ Boston M. and S. Jour., Dec. 20, 1900.

² Arch. of Pediat., Nov., 1900.

³ Bull. et Mém. de la Soc. Méd. des Hôp. de Paris, June 20, 1901.

⁴ *Ibid.*

⁵ Rev. Mens. des Mal. de l'Enf., July, 1901.

tions, and after eliminating cases in which the disease developed in less than 24 hours after injection or more than 30 days after, there were 6% of failures. On the other hand, the author stated that he had recently made 90 preventive injections with but 2.17% of failures. Porter¹ reports a series of 24 families in which preventive injections were used. Only 1 case of diphtheria occurred. In another series of cases in which no prophylactic injections were given the disease occurred secondarily in one-third of the houses and one-sixth of the inmates contracted the disease, in spite of the fact that a large number of the primary cases were removed to the hospital. The author finds 500 units sufficient. Blake² reports a series of 35 prophylactic injections. The treatment was instituted after 3 cases of diphtheria had developed in the Suntrap Children's Home, Essex. No secondary cases developed. Voisin and Guinon³ describe an epidemic of diphtheria in the Salpêtrière Hospital among idiots and epileptics. Prophylactic injections were given to all those exposed to the contagion. After that but 4 cases appeared, all mild in character. One severe case developed, however, 2 weeks later, ending fatally in 24 hours, showing that the prophylactic action of the antitoxin, while efficacious, is not of very long duration. Talamon⁴ reports observations made upon 50 cases of pneumonia, ranging in age from 5 to 75 years, treated with large doses of antidiphtheric serum. In grave cases he advises two injections daily. Under this treatment he believes that the duration of the disease is shortened, the chances of complications are lessened, and the mortality is lowered 10%. The only contraindications are liver and kidney disease. Raynaud⁵ also reports a comatose case of double pneumonia in a patient aged 67 years, in which two injections of 20 cc. each were followed by very prompt defervescence and ultimate recovery.

Antitoxin of Tetanus.—There has been of late a greater tendency on the part of the profession than was formerly apparent to report failures under the antitoxin treatment of tetanus. As a result, recent statistics are not so favorable as those formerly published. Parry⁶ has collected 26 cases of tetanus treated with intracerebral injections of antitoxin. Of these, 17 patients died and 9 recovered. The author remarks, however, that these statistics are of little value, since they do not represent a series of cases, but simply recorded cases by isolated observers, and there is always a greater tendency to report successful rather than unsuccessful cases. The numbers, too, are very small, and the reports are often incomplete in a most important detail—the period of incubation. In 4 of the successful cases this is given; in 3 of them it was over 14 days, in 1 of them it was 7 days. In 1 case in which there was recovery from tetanus, death resulted from cerebral abscess 8 weeks later. The author concludes that it is not proved, so far, that in the antitoxin we have a remedy that will control the disease when it

¹ Am. Med., July 13, 1901.² Jan. 26, 1901.³ Bull. et Mém. de la Soc. med. des Hp. de Paris, June 13, 1901.⁴ Jour. des Praticiens, Mar. 9, 1901.⁵ Méd. Mod., Mar. 27, 1901.⁶ Therapist, Apr. 15, 1901.

develops its acute condition. Homa¹ reports a case of tetanus in a boy aged 9 years, whose toes were frozen. Trismus followed, and gangrene set in in both feet, requiring amputation. Tetanus bacilli were found in the discharge, and the Tizzoni antitoxin was given. As many as 47 convulsions occurred in 24 hours; yet the child recovered 4 months later. Lyster² reports a case successfully treated with antitoxin and large doses of chloral, in which the period of incubation was 6 days. McCaw³ reports a case of tetanus neonatorum successfully treated with antitoxin administered subcutaneously, and Leyden⁴ reports prompt recovery of a case of tetanus in a man, aged 22, from the subdural injection of Behring's serum on the third day of his attack. Barker⁵ also reports a case of tetanus (period of incubation 14 days) in which recovery followed subdural injections of the serum. Wilms⁶ records 2 cases of chronic tetanus in which recovery occurred under the serum treatment, and 4 cases of acute tetanus which proved fatal, no improvement whatever being observed from the use of the antitoxin. The periods of incubation in the unfavorable cases were 8, 8, 7, and 9 days respectively. In all 4 cases the serum was used within the first 24 hours after the appearance of symptoms. The fourth patient received 4,000,000 Tizzoni's units within 30 hours, and on the second, third, and fourth days, 1,000,000 units each day. Death followed on the sixth day. The author believes that acute tetanus is not benefited by serum treatment. Herbold⁷ reports 2 cases, Taylor⁸ 5 cases, Reuter⁹ 1 case, and Whitridge¹⁰ 1 case, which were unsuccessfully treated with tetanus antitoxin. In Whitridge's case the period of incubation was 13 days, 9 injections of 10 cc. each were given subcutaneously without benefit, ultimately morphin was used, and recovery finally followed.

Antityphoid Serum.—This is not an antitoxin, since it consists of sterilized cultures of typhoid bacilli. Experiments on animals have shown that inoculation with dead typhoid bacilli gives them an increased power of resisting infection by living typhoid bacilli. As to the duration of immunity little is known; it is probably about 2 years. Parry¹¹ states that 105 of the attendants at Maidstone Asylum were not inoculated, and 19 cases of typhoid occurred among them; 95 were inoculated, and among these there was not a single case. The inoculations have no curative value, and no protection is afforded till after 3 to 5 days have elapsed from the date of the inoculation. Cayley¹² publishes some facts with regard to the protective value of inoculation in typhoid fever as practised upon members of the staff of the Scottish National Red Cross Hospital. Of the first section, 61 in number, 57 were inoculated twice, at intervals of about 10 days, with fresh vaccine. Two of the remaining 5 had already had typhoid, and the other 2 were once inoculated. This section was afterward in the thick of the great typhoid

¹ Wien. klin. Woch., Nov. 22, 1900.

² Brit. Med. Jour., Mar. 30, 1901.

³ Lancet, Nov. 17, 1900.

⁴ Deut. med. Woch., July 11, 1901.

⁵ Münch. med. Woch., Aug. 21, 1900.

⁶ Therapist, Apr. 15, 1901.

⁷ Brit. Med. Jour., Feb. 9, 1901.

⁸ Deut. med. Woch., July 11, 1901.

⁹ Münch. med. Woch., Feb. 5, 1901.

¹⁰ N. Y. Med. Jour., July 20, 1901.

¹¹ Phila. Med. Jour., Oct. 20, 1900.

¹² Brit. Med. Jour., Jan. 12, 1901.

epidemic, but not one case of enteric fever occurred among them. Of the second section, 82 in number, most were inoculated, but the material had been on board some time, and was not so fresh as in the case of the first section. One nurse refused to be inoculated, and she was the only one who subsequently had typhoid. Of the orderlies, 5 developed enteric; of these 5, 2 had been once inoculated, and 3 not at all. The third section, 20 in number, were all inoculated, and all remained immune. Cayley thinks that, although these numbers are not sufficiently large to prove anything, they are very strongly suggestive of the protective power of the vaccine. He also mentions that of 92 cases of enteric admitted at Kroonstadt, 15 had been inoculated, 70 not inoculated, the rest doubtful; 11 patients died, 1 once inoculated, 10 not at all inoculated. He is convinced that the attacks were, on the whole, much milder and the disease of shorter duration in the inoculated than in the uninoculated. Wright¹ reports on the results of inoculations in Cyprus and Egypt during 1900. Of a total number of 2669 uninoculated and 720 inoculated soldiers, 68 of the former and 1 of the latter contracted the disease. The reduction was nineteenfold. The one patient of the inoculated series was attacked shortly after the time of the inoculation, and it is thought possible that he had the disease prior to this. Wright² also gives the statistics of an epidemic. Of 655 susceptible persons, 541 were inoculated. Among these there occurred subsequently 7 cases of typhoid fever, while among 114 uninoculated there occurred 29 cases of the disease. Walker³ contributes an important article on the preparation of a true antityphoid serum which shall have real therapeutic value. He calls attention to the proposition enunciated by Ehrlich, that a difference in the species between the animal immunized and the animal to be protected or cured formed a barrier to success of the gravest importance in the production of antityphoid, antistreptococci, antipneumococci, and other antimicrobial serums. The author brings out clearly the necessity of recognizing the differences between antimicrobial and antitoxic serum. The former has a bactericidal action, the latter none. The former also may have antitoxic power—that is, so far as the anticholeraic serum is concerned. The author believes that there is sufficient evidence to show (1) that such a serum can be obtained by immunizing horses against *Bacillus typhosus*; (2) that the initial stages of the process may be shortened by using the method of Bokenham; (3) that a high degree of immunization must be obtained, and the employment of living cultures in the later stages is desirable; (4) that the serum must be made widely polyvalent by the use of as many as largely different species of typhoid bacilli as is practicable; (5) that the relative value of the serum obtained may be determined by a determination of its relative agglutinative power; (6) that it is open to question whether the efficacy of the serum might not be further increased by immunization of the horses against the colon bacillus also, or by the addition to the serum of a certain proportion of anticoli serum from a horse treated with that organism.

¹ Brit. Med. Jour., 1901, No. 2105.² Brit. Med. Jour., Oct. 26, 1901.³ Jour. of Path. and Bact., vol. VII, No. 3, 1901.

Antivenomous Serum.—Hanna ¹ reports a case of cobra-poisoning successfully treated with Calmette's antivenene. While assisting in the abstraction of poison from a full-sized cobra, the operator was bitten in the thumb. The only local treatment was sucking the thumb. Within from 20 to 30 minutes 18 cc. of antivenomous serum was injected. About 2½ hours after the injection symptoms of poisoning showed themselves in slight stupor, nausea, vomiting, and paresis of the legs. About 3½ hours after the bite another injection of 10 cc. of the serum was made, and in a short time all general symptoms disappeared. McFarland ² summarizes the treatment of snake-bite as follows: Stop immediately the circulation in the bitten member; enlarge the fang wound, and suck forcibly to extract the poison; inject hypodermically in about a dozen areas around the wound 3 to 6 drops of a fresh 10% aqueous solution of calcium chlorid; give strychnin as a respiratory stimulant; and inject immediately from 10 cc. to 20 cc. of antivenomous serum, and repeat these injections frequently. The author also advises that persons going into dangerous regions should carry serum with them.

Apocodein.—This compound holds the same relation to codein that apomorphin holds to morphin. It has been employed chiefly as a hypnotic and as a sedative expectorant. Its laxative action was first noted by Toy, ³ and has been recently studied by Raviart and Bertin. ⁴ These observers found that in 25 out of 34 cases of constipation resulting from various causes, a single dose (30 minims of a 1% solution), administered hypodermically, would produce one, two, or even three evacuations, with no more than a very slight somnifacient effect. They conclude that apocodein is a safe remedy for transitory constipation and often for the habitual affection.

Apomorphin.—Douglass ⁵ confirms an observation made by Lewis in 1900, that apomorphin, when administered in emetic doses in acute alcoholism, often quiets nervous excitement apart from the vomiting that it may produce. Douglass has found the drug a useful somnifacient in many cases of insomnia, the dose being $\frac{1}{30}$ grain, hypodermically. Even this dose may in susceptible persons cause vomiting, or at least nausea, unless the patient remains recumbent; so it should be given after going to bed. Adams ⁶ also testifies to the sedative action of apomorphin in acute alcoholism.

Argentamin.—This is an alkaline solution of silver phosphate in a solution of ethylene-diamin. Bergel ⁷ has employed it successfully in a variety of diseases as a substitute for silver nitrate. In acute gonorrhea he begins with a 10% solution as a basis, and uses 1:400 to 1:200 dilutions as an anterior injection. In the later stages of the disease instillations of even 1:10 are well borne. In syphilitic pharyngeal diseases the author recommends 5% to 10% solutions. In suppurative conjunctivitis he employs instillations of from 1% to 2% solutions 3 or

¹ Lancet, Jan. 5, 1901.

³ Jour. de Méd. de Bordeaux, 1895.

⁵ Therap. Gaz., Jan., 1901.

² Internat. Med. Mag., Sept., 1900.

⁴ Echo Méd. du Nord., Dec. 2, 1900.

⁶ Brit. Med. Jour., 1900, No. 2050.

⁷ Therap. Monatshefte, Bd. XIV, S. 361.

4 times daily. Internally it has given good results in enteritis and tuberculous diarrhea, the dose being a teaspoonful to tablespoonful of 0.5% to 1% solution every 2 or 3 hours, in water or in glycerin.

Arsenic.—Rolleston¹ writes that for the curious condition known as geographic tongue arsenic may save us further trouble in knowing what to do. As an appetizer or pick-me-up, a dose before meals of a minim of Fowler's solution, with 10 grains of bicarbonate of sodium and infusion of gentian, is a useful and popular prescription. It is also recommended in small doses in other forms of dyspepsia, and especially in irritative dyspepsia and alcoholic vomiting. Curious as it may seem, it produces a good effect if given before meals. In the annoying form of morning diarrhea, in which a large evacuation is passed with but little warning half an hour or so after breakfast, a minim of Fowler's solution frequently acts like a charm. It has also been recommended for mucous colitis, that troublesome form of disease manifesting itself by the passage of casts of the bowel formed of coagulated mucus. When arsenic given by the mouth disagrees, it may be given hypodermically, and may be more conveniently injected into the substance of the muscles than into the subcutaneous tissues. Large doses can thus be often borne without any bad effects. Rolleston cites a case in which arsenate of sodium (1 : 500 of eucaïn B solution) was given hypodermically for 271 days, 105 grains of the drug having been thus administered without toxic symptoms. The solution should be injected at blood-heat. The author has tried the new preparation known as sodium cacodylate, both by the mouth and hypodermically, and has never seen any toxic symptoms from its use. On the whole, he regards sodium cacodylate as less powerful, both for good and for evil, than ordinary arsenic. Brooke and Roberts² describe the effects of arsenic upon the skin, based upon the recent epidemic of beer-poisoning. The following lesions were found: Erythema, mostly diffuse, and situated on the trunk and limbs. Herpes was common and always unilateral. Pemphigoid eruptions on the hands and feet were occasionally observed. Hyperidrosis was frequent. Pigmentation with considerable variation in the tint in contiguous areas was noted in many parts of the body. Hyperkeratosis on the palms and soles is regarded by the authors as characteristic. The nails and hair were generally unchanged. Desquamation was the rule. Ecchymoses were sometimes present and resulted from degeneration of the walls of the small blood-vessels. Worrington³ states that the most obtrusive phenomena observed during the epidemic of poisoning from arsenical beer were: Numbness and tingling in both hands and feet; sometimes a sense of burning in the feet; acute pain on walking, especially at the heel and the ball of the great and little toes; some pain on moving the joints and muscles; painful flushing of the feet, resembling erythromelalgia; objective impairment of sensation was absent; the knee-jerks were often present and at times unusually brisk. Tunnicliffe and Rosenheim⁴ suggest that some of the symptoms observed

¹ Treatment, Apr., 1901.

² Brit. Jour. of Dermat., Apr., 1901.

³ Brit. Med. Jour., 1901, No. 2088.

⁴ Lancet, 1901, vol. CLX, p. 318.

in the epidemic mentioned may have been due to selenium, which is highly poisonous, and an invariable accompaniment of pyrites.

Arsenic Iodid.—Saint-Philippe¹ again calls attention to the value of arsenic iodid in the troublesome bronchitis of strumous children. It may be given in water during the meal, or to young children in milk. It should not be given when there is gastric disturbance. The author recommends a solution containing 30 centigrams of the drug to 30 grams of distilled water, of which 5 drops may be given after each meal, the dose being increased 1 drop morning and evening until 15 or even 20 drops at a dose be taken. This maximum dose should be continued for a month and then gradually decreased in inverse order to 5 drops again. The solution should be kept in a cool place to prevent precipitation of hydriodic acid.

Aspidium.—Gotthilf² reports a case of poisoning in an adult from 2.5 drams of pure extract of aspidium, without subsequent catharsis. The chief symptoms were headache, apathy, vertigo, and anorexia, followed by coma, dilation of the pupils, thready pulse, increased patellar reflexes, and tonic spasms of the entire body. The author dwells on the importance of giving castor oil to prevent absorption of the drug and subsequent poisoning. [Since castor oil is believed to favor the absorption of the active principle of male fern and has been used in many of the fatal instances, some other cathartic should be recommended.]

Aspirin.—This compound is produced by the action of acetic acid anhydrid upon salicylic acid. According to Hale,³ it undergoes little or no change in the stomach, but is decomposed in the small intestines, liberating nascent salicylic acid, and leaving the acetic acid to combine with alkalis to form the beneficial compounds of sodium and potassium acetate. The author has found the drug especially serviceable in the so-called "growing pains" of children. It does not disturb the stomach like most salicylic compounds. Moir⁴ reports 8 cases of rheumatism complicated with valvular heart-disease, in which he used aspirin with very satisfactory results. The dose of aspirin is the same as that of sodium salicylate. The drug is almost insoluble in water.

Atropin.—Many reports have recently been published concerning the value of atropin in desperate cases of intestinal obstruction. This treatment appears to have been first suggested by Murray.⁵ Most of the recent literature on the subject, however, has appeared in the "*Münchener medicinische Wochenschrift*" for the past 3 years. Sailer⁶ finds that there are altogether 23 cases on record in which atropin was employed. One of these cases was not relieved by atropin, and the patient was subsequently cured by laparotomy. Of the remaining 22 cases, 18 ended in recovery and 3 ended in death. Sailer believes it not unlikely that the explanation of Batsch and Simon, both of whom

¹ Rev. Mens. des Mal. de l'Enf., July, 1901.

² Münch. med. Woch., 1901, Bd. XLVIII, S. 1096.

³ Pediatrics, July 5, 1901.

⁴ Therapist, Mar. 15, 1901.

⁵ Rough Notes on Remedies, 1899.

⁶ Therap. Month., Aug., 1901.

consider the good results to be due to paralysis of the smooth muscle-fibers of the intestine, contains an element of truth. Since only heroic doses ($\frac{1}{32}$ to $\frac{1}{15}$ grains) are efficient, and such doses are in themselves dangerous, and since much valuable time may be lost in awaiting the outcome of the atropin treatment, the author concludes that the drug should be employed only in inoperable cases. Gebele¹ raises a warning cry against the too free use of atropin in ileus, since it too often obscures the clinical picture, and, far from being infallible, it prevents the surgeon from selecting the proper moment for operation. He believes that it is only in the paralytic or spastic form of obstruction that internal treatment has any effect, and here small doses of morphin have the same effect as atropin, and are to be preferred. O'Donovan² draws attention to the usefulness of atropin hypodermically in pulmonary edema. He states that it is safe to begin with $\frac{1}{100}$ grain, and repeat it in half an hour, or at longer intervals, until the system is well under its influence. As the action of the drug is exerted chiefly on the lungs and terminal branches of the arteries, it is well to supplement it with a direct cardiac stimulant, preferably strychnin. Reichert,³ while admitting that atropin has at times proved of value in morphin-poisoning, is convinced, as the result of elaborate experiments, that the drug cannot be classed among the reliable, prompt, and powerful respiratory excitants, but among those which are very unreliable and of very ordinary power. He notes that atropin is antagonistic to the action of morphin upon the circulation during only the first and second stages of the poisoning, and that during the third stage small doses are useless, while moderate to large doses are absolutely harmful. The author has found also that in morphinized dogs atropin not only does not lessen, but intensifies the depression of general metabolism. He points out that atropin and morphin, instead of being largely antagonistic, are in certain important respects synergistic. Thus both are narcotics; both behave like double poisons, one acting as a general excitant and the other as a general depressant; both cause coexistent states of excitation and depression; both cause in man a primary stage of psychic excitation, a secondary stage of psychic and physical depression; both primarily excite and secondarily depress the respiratory center, the heart, the cardioinhibitory apparatus, and the vasomotor mechanism; both primarily increase and secondarily decrease the arterial pressure, the pulse-rate, and probably secretory activity in general; both markedly lessen metabolic activity and lower body-temperature when given in moderate to large doses; both are delirifacients, hypnotics, paralyzants, and convulsants; both cause severe motor depression; both depress the motor and sensory nerves; both in small doses lessen and in toxic doses excite peristalsis; and both kill by paralysis of the respiratory center. The author concludes that atropin may be of value in morphin-poisoning, but only before the third stage, and then only when given in small or moderate doses. Even here its usefulness is limited to a possible excitation of the respiratory movements.

¹ Münch. med. Woch., 1901, No. 33.

² Am. Med., Sept. 14, 1901.

³ Therap. Month., May, 1901.

and a stimulation of the circulation, both of which, however, may be fully compensated for in its pernicious effects, chiefly upon general metabolism. Large doses in the second stage and moderate or large doses in the third stage are invariably harmful. Bashford¹ has arrived at conclusions somewhat similar to those of Reichert. He found that half the usual minimum fatal dose of morphin is fatal in white rats when combined with one-third of the minimum fatal dose of atropin. He believes that most observers have employed too large doses of atropin in morphin-poisoning, and that not more than $\frac{1}{4 \times 2}$ grain should be injected, and that the dose should not be repeated. In another communication Reichert² concludes from an experimental research that death in atropin-poisoning invariably results from paralysis of the respiratory center, but that the center has great recuperative power, and that if artificial respiration be properly practised the center recovers its activity, when there is in consequence a marked improvement of other depressed states. He believes that in man atropin-poisoning should be readily treated if artificial respiration be persistently and intelligently practised, as by Laborde's method, and accompanied by such other treatment as indications suggest.

Bismuth Subnitrate.—Dreesman³ reports a case of poisoning in a young man from the application to a burn of an ointment containing 10% of bismuth subnitrate. Three weeks later a black sediment appeared in the urine, and 3 weeks following this there appeared severe stomatitis with considerable pain and dysphagia, and a greenish discoloration on the gingival borders, soft palate, and tongue. The symptoms slowly disappeared after the withdrawal of the ointment. Two similar cases are reported by Mühlig.⁴

Borax and Boric Acid.—Tunnicliffe and Rosenheim⁵ present the result of an extensive series of experiments to demonstrate the influence of boric acid and borax, used as food preservatives, upon the nutrition of the consumer, especially children. Their conclusions are that continued doses of 1 gram of boric acid or 1.5 grams of borax per diem have no influence whatever upon proteid metabolism, either in healthy or unhealthy children, or upon phosphorus-metabolism, or the assimilation of fat. Body-weight increased in all cases. Contrary to the observations of Foster, they found that boric acid did not increase the quantity of feces, nor their nitrogen or phosphorus percentage; neither were they able to confirm his statement that boric acid inhibits intestinal putrefaction. Evidently boric acid or borax may be utilized as food preservatives in moderate amounts without danger to the consumer.

Brain Emulsion.—Krokiewicz⁶ reports 2 cases of tetanus successfully treated by brain emulsion hypodermically. An emulsion made from an entire rabbit's brain was injected subcutaneously, the injection

¹ Arch. Internat. Pharmacodyn. et de Thérap., vol. VIII, fasc. 3 et 4, 1901.

² Phila. Med. Jour., Jan., 1901.

³ Münch. med. Woch., Feb. 5, 1901.

⁴ Münch. med. Woch., Apr. 2, 1901.

⁵ Jour. of Hyg., Apr., 1901.

⁶ Wien. klin. Woch., Aug., 1900.

being repeated in the first case four times. He states that under this plan of treatment there have been 8 recoveries and 2 deaths.

Bromids.—Clarke¹ draws the following conclusions concerning the use of the bromids in epilepsy: (1) Bromids still hold a very important place in epileptic treatment; (2) tonics must be given constantly while administering bromids; (3) bromid salts should be given gradually to find the epileptic's sedative level; (4) baths, high enemas, alimentary antiseptics, massage, and electricity are absolutely essential to successful bromid medication; (5) bromin is a worthy successor to the bromids in many cases; (6) salt starvation or semisalt starvation is a great adjuvant to bromid treatment.

Bromoform.—Burton-Fanning,² who in 1893 recommended bromoform in the treatment of whooping-cough, reports a case of poisoning from the drug. He states that in all his cases in which toxic symptoms were of any severity the untoward result had been always produced by the last dose in the bottle. For the last 7 years he has directed that the last dose in the bottle (when mucilage has been the menstruum) should be thrown away, and during this time he has not observed a single accident. The drug can be satisfactorily administered in alcohol (bromoform, æj ; alcohol, æiij ; glycerin, 5ss), but the addition of water in any form, even as syrup or mucilage, causes the bromoform to be thrown down, either immediately or after some time. The author believes that the dose advocated by many writers is too large. He advises, as the preliminary doses, $\frac{1}{2}$ minim for children under 1 year, 1 minim for those under 4 years, and 2 minims up to 8 years. These doses should be given thrice daily at first, later at shorter intervals, and cautiously increased in rebellious cases. More extensive experience has confirmed his opinion of the efficacy of the drug.

Bromopin.—This is stated to be a 10% solution of bromin in oil of sesame. It is an oily liquid quite free from irritant properties. The dose is from 2 to 4 drams. Lorenz³ has used it in 34 cases of epilepsy. In 11 patients the attacks grew worse; in 13 the number of attacks was lessened; in 3 there was temporary improvement; the rest remained unaffected. The majority of the patients gained in weight, and seemed in better general condition. The author believes that the results are far superior to those given by the opium-bromid treatment. Frieser⁴ has also employed bromopin successfully in a variety of nervous diseases other than epilepsy. He prefers to give it subcutaneously in doses of $2\frac{1}{2}$ drams. Neither local irritation nor bromism resulted from this plan of treatment, and the author concludes that bromopin must be considered the best of the bromin compounds so far known.

Caffein.—Anten,⁵ in an extended research on the xanthin diuretics (caffeine and theobromin), gives the following conclusions: Caffeine can, under certain conditions, act as a diuretic in the dog. Its habitual inac-

¹ Am. Med., Apr. 13, 1901.

² Brit. Med. Jour., May 18, 1901.

³ Wien. klin. Woch., Nov. 1, 1900.

⁴ Klin. therap. Woch., Bd. VII, S. 646.

⁵ Arch. Internat. de Pharmacodyn. et de Therap., 1901, vol. VIII.

tivity in this animal may be considered as being due to its stimulant influence on the vagus, in consequence of which the renal secretory function is directly inhibited. Theobromin acts as a diuretic in the dog. Xanthin diuretics do not stimulate the secretion of lymph. There is no relationship between the degree of solubility and the diuretic activity of the xanthin bodies. Xanthin diuretics seem to favor the elimination of nitrogenous substances, notably urea and uric acid; and inasmuch as these are secreted by means of the epithelium of the convoluted tubules, the xanthin diuretics, therefore, act particularly on that epithelium.

Calcium Carbide.—Grouzdey¹ speaks favorably of this caustic preparation in cases of inoperable uterine cancer. He applied it to the diseased area in gauze bags, protecting the vagina with tampons. He finds that healthy granulations are formed, foul discharges and hemorrhages are arrested, while pain is relieved. The good effects persist for a week. No ill results are observed when the vagina is thoroughly dried before the carbide is applied. Chase,² on the other hand, is convinced that the use of the carbide does not reduce odor or hemorrhage, nor give more comfort to the patient than other rational lines of treatment; moreover, calcium carbide is open to the same dangers as other caustics—corrosive action in the wrong place, fistula, perforation and fatal peritonitis, or occlusion of the ureters. He contends that the activity of the carbide is due to the liberation of quicklime, and not to acetylene, which is neither caustic nor bactericidal, and that lime is not a rational caustic to select because of its superficial action, the character of the necrosis, and the tendency to promote bleeding.

Calcium Chlorid.—Many writers have testified to the value of this drug as a hemostatic for controlling various forms of hemorrhage when the blood lacks the property of coagulation. As was pointed out by Wright, who first suggested its use, it may diminish coagulability if given too freely or for longer periods than three or four days. Schwalbe³ holds that in the process of clotting the red corpuscles disintegrate into blood-platelets, and that the formation of these platelets is the morphologic characteristic of clotting. He thinks it possible that a ferment is liberated in the disintegration of the red cells. With weak salt solutions (2 or 3%) there is active platelet formation and clotting, but with strong salt solutions (30%) disintegration is absent and clotting does not occur. He finds, however, that with solutions of calcium chlorid the disintegration of red cells is intense. Lafond-Grellety⁴ states that calcium chlorid is very useful in menorrhagia. He recommends calcium chlorid, 2 drams; syrup, 2 ounces; water, 6 ounces. A tablespoonful to be taken once, twice, or thrice daily, according to need.

Calcium Iodate.—Mackie⁵ has found this drug an excellent substitute for iodoform, its advantages over the latter being the absence of smell, the checking of fetor, the prevention of hypergranulation, and

¹ La Gynécologie, 1900, No. 4.

² Jour. Am. Med. Assoc., June 22, 1901.

³ Münch. med. Woch., Mar. 5, 1901.

⁴ Semaine Méd., Mar. 20, 1901.

⁵ Merck's Arch., Feb., 1901.

the inhibition of pus-formation. Internally, in doses of from 3 to 4 grains, he has found it useful in checking gastric fermentation.

Camphor.—Stengel ¹ recommends camphor as a cardiac stimulant in certain cases of typhoid fever when the maximum of stimulation is required to combat depression. Camphorated oil consisting of 1 grain of camphor in 15 minims of sterilized olive oil may be injected under the skin without pain, and with rarely any unpleasant consequences, such as induration or abscess. The oil is quickly absorbed and the stimulation is prompt and continuous, at the same time quieting the nervous system. Injections of 1 or 2 grains may be given every 2 hours, although as a rule 4 hours should elapse before the dose is repeated. Bohlen ² reports 2 cases in which marked and intractable delirium followed moderate-sized doses of camphor. The first patient had heart disease and received $\frac{3}{4}$ of a grain of camphor every 2 hours; the second patient had heart symptoms following influenza, and received the same dose. The delirium developed after the first patient had received $9\frac{3}{4}$ grains, and the second patient 9 grains.

Cannabis Indica.—Kossobudski ³ reports 3 cases of poisoning in women from the use of this drug in medicinal doses. The first woman received 10 drops of the fluid extract twice daily; the second woman, 5 drops thrice daily; and the third woman 8 drops thrice daily. The chief symptoms were burning pain in the stomach, maniacal delirium, and tremors. Prompt relief followed lavage and the administration of bromids. The author advises that the dose of the fluid extract should not exceed 7 drops.

Cantharides.—Muraturi ⁴ reports the case of a young woman who suffered from a severe attack of sciatica. A large blister was placed over the course of the sciatic nerve and allowed to remain for 16 hours. There followed anuria for 48 hours, edema, intense dyspnea, complete amaurosis, and convulsions. The alarming state continued for several days, but recovery followed.

Carbolic Acid.—Von Bruns ⁵ states that carbolic acid in concentrated solution is relatively less toxic than when diluted, that its penetrability during its brief influence is slight, and that the bactericidal action of the pure acid surpasses that of sublimate in albuminous compounds. He recommends without hesitation the application of pure carbolic acid in small quantities and for one minute, followed by immediate irrigation with absolute alcohol, as a remedy that forms a valuable adjunct to mechanical procedures in infected wounds. Zagato ⁶ has obtained excellent results in acute articular rheumatism by tapping the affected joints under antiseptic precautions, and subsequently injecting into them, by means of a long hypodermic needle, 15 minims of a 2% aqueous solution of carbolic acid. He states that this treatment is followed by a rapid disappearance of the painful symptoms. The same treatment has also proved successful in the hands of Balduzzi. ⁷ Scham-

¹ Therap. Gaz., Nov. 1900.

³ Vrateh, vol. XXII, No. 11.

⁵ Phila. Med. Jour., May 18, 1901.

² Deut. med. Woch., May 16, 1901.

⁴ Gaz. degli Osped., Feb. 10, 1901.

⁶ La Semaine Méd., Feb. 3, 1901.

⁷ Gaz. degli Osped., Apr. 21, 1901.

berg¹ has observed marked improvement in generalized pruritus, and in one or two instances practical cure, from the internal use of carbolic acid in doses of from 1 to 4 grains in sherry wine. He thinks the good result may be attributable to the elimination of the drug through the skin in the form of carbolates.

Chaulmoogra Oil.—Hallopeau² concludes that cases of leprosy treated by intramuscular injections of this oil, or its internal administration, may be so far improved that one can correctly speak of a cure. More frequently, however, the disease continues, but in a benign form. In certain cases in spite of treatment there are intense local and general recrudescences. The author prefers hypodermic injections when they can be tolerated, but they frequently excite violent pain, transitory fever, and even pulmonary emboli. Thin³ reports a case of nerve leprosy in which recovery followed the use of chaulmoogra oil internally and externally for more than 2 years.

Chloralose.—The action of this drug, which is technically anhydro-glucoc-chloral, has been carefully studied by Tyson.⁴ He concludes that it is a prompt and safe hypnotic, more prompt in its action than any drug except morphin; that it is more prompt than chloral and efficient in much smaller doses; that its effects occasionally include involuntary actions, which, while surprising and even fantastic, are nevertheless harmless; that the maximum dose is 5 grains in capsule, which may have to be repeated in not less than an hour. [While this remedy is undoubtedly useful, many unexplained and serious peculiarities of action are on record.]

Chloretone.—Stevens⁵ presents a clinical report on the use of this drug as a hypnotic. He obtained the best results with it in insomnia unassociated with organic disease, but its action was often favorable in chronic heart and kidney disease. No depression of the circulation was observed after its use, even in chronic heart disease. The author concludes that chloretone is a safe hypnotic of moderate power, which rarely gives rise to unpleasant after-effects, but of which a toleration is quite rapidly acquired; which is especially adapted for use in cases of insomnia unattended with pain, high fever, or pronounced nervous excitement. Brownrigg⁶ states that chloretone is a powerful and pretty certain hypnotic if given in sufficient dose. It produces anesthesia of the mouth, throat, and stomach, and paresthesia of the extremities. In 18.3% of cases sleep followed its use in 15 minutes, and in 29.5% in from 15 to 30 minutes, the average interval being 48 minutes; the duration of the sleep was about 4½ hours. The author found it invaluable when pain was a factor in the insomnia. Hammond⁷ cites a case of epilepsy in which he found that 5 grains of chloretone acted as well as 30 grains of bromid. Under its use the appetite improved, and the digestive disturbances occasioned by 3 years' administration of bromids disappeared.

¹ Therap. Gaz., June 15, 1901.

³ Brit. Med. Jour., May 4, 1901.

⁵ N. Y. Med. Jour., Jan. 23, 1901.

² Bull. de l'Acad. de Méd., 1901, No. 9.

⁴ Jour. Am. Med. Assoc., Apr. 6, 1901.

⁶ Boston M. and S. Jour., July 18, 1900.

⁷ Toledo M. and S. Reporter, May, 1901.

Sinkler has also spoken favorably of the action of chloretone in certain cases of epilepsy. Hirschman ¹ has found that the administration of chloretone serves to prevent nausea and vomiting during anesthesia. To women he gave 10 grains; to men, 15 grains, about $\frac{1}{2}$ hour before operation; and in a series of 50 cases, 30 of which received the drug, only 3 had nausea, and 1 vomited; while of the other cases, 24 had nausea or vomiting. Impens ² believes that chloretone is an extremely dangerous narcotic, much more dangerous than chloral; and that its only advantage over chloral is in being less irritant. From a series of animal experiments he concludes that chloretone is $2\frac{1}{2}$ times more toxic than chloral; that in large doses it reduces the respiratory effort and the volume of respiration; that it paralyzes the vasomotor centers and thereby induces a marked fall of blood-pressure, at times so much as 43%; and that doses sufficient to produce sleep depress the heart and lower the body-temperature. Rudolph ³ has found that the drug has little or no effect upon the pulse, respiration, or blood-pressure for hours, but eventually, if the dose has been large enough, these become depressed, and the animal dies, the heart-beat ceasing before the respiration. He also states that body-temperature is profoundly depressed. He believes that a drug with such actions should be employed with great caution. Rasely ⁴ writes that in hundreds of minor operations he has used chloretone as a substitute for cocain. He claims that the drug produces complete anesthesia without depression or exhilaration. He employs a saturated aqueous solution along the line of incision. He believes that chloretone could be substituted with advantage for cocain in subarachnoid anesthesia. Darche ⁵ has found combinations of chloretone, mercuriol, and boric acid in the form of ointment very serviceable in painful ulcers.

Chloroform.—The committee of the British Medical Association ⁶ appointed to consider the relative safety of the various anesthetics reports that chloroform is twice as dangerous in males as in females; that its use is most perilous in infancy and after 30 years of age, and least so from 10 to 30 years of age; that in health it is very much more dangerous than other anesthetics, and in disease, while it remains the least safe anesthetic, the disparity between it and other anesthetics is less marked than in health; that when danger occurs under chloroform, the symptoms in the large majority of cases are those of primary circulatory failure; that imperfect anesthesia is the cause of a large number of accidents under chloroform; that while vomiting is more common after ether, severe and prolonged vomiting is more common from chloroform; that struggling is much more frequent in the complicated cases, and must therefore be regarded as a source of grave danger under chloroform; that circulatory depression is more common after chloroform than after ether; that while respiratory complications are of equal frequency under ether and chloroform, those that occur under ether are mostly trifling

¹ N. Y. Med. Jour., Dec. 15, 1900.

² Canad. Pract., No. 6, 1900.

³ Canad. Pract., Apr., 1901.

⁴ Arch. Internat. de Pharm., 1901, No. 8.

⁵ Internat. Jour. of Surg., Apr., 1901.

⁶ Lancet, Jan. 26, 1901.

and transitory, while those occurring under chloroform are more grave and persistent. The general conclusion drawn is that by far the most important factor in the safe administration of anesthetics is the experience which has been acquired by the operator. Boureau,¹ who has given chloroform 1200 times without a death, believes that there is no contraindication to this anesthetic if properly used. He uses a compress folded 4 times and laid directly over the face, upon which 4 or 5 drops of chloroform are placed. At the beginning the compress is held at a distance from the face, nearing it gradually. Small doses frequently repeated give more favorable results and are less dangerous. In the entire series the author has had but 12 syncope, and these were successfully treated by Sylvestre's method of artificial respiration. The length of the anesthesia ranged up to 2 hours and 56 minutes. The quantity of chloroform required to produce muscular relaxation varied considerably, but on an average was 8 cc. to 10 cc. The length of time required to induce anesthesia was usually from 8 to 10 minutes. Bacarani² concludes from an experimental research that chloroform narcosis, if mild, does not affect the specific gravity of the blood; that it diminishes the number of red cells, but not always in a given proportion; that it increases the number of leukocytes in the peripheral circulation; that it does not affect the percentage of hemoglobin; that it imparts to arterial blood the absorption-band of methemoglobin; that it increases the bactericidal properties of the blood; that it affects the red cells of youth more profoundly than those of adults; that under chloroform death may occur without notable changes in the blood; and that the action of chloroform may persist for several hours, or even days. Benassi³ concludes that chloroform diminishes the number of both red and white cells, especially the number of the latter; that this diminution varies in different subjects and is not in proportion to the length of the narcosis, but that the changes in form of the red cells and the duration of the blood alterations bear a relation to the length of narcosis and the amount of chloroform used. Nicolaysen⁴ reports the case of a woman, aged 29 years, operated on for appendicitis, who for a week following the operation had hematorporphyrinuria from the chloroformization.

Cinnamon.—Ross⁵ concludes from a careful series of observations that cinnamon, if used promptly, will cure most cases of influenza in a comparatively short time. The dosage is not stated.

Citric Acid.—Zaalberg⁶ reports a case of severe ozena very much improved by local applications of powdered citric acid, thus confirming the favorable opinion of this treatment expressed by Hamm and Somers. (See YEAR-BOOK for 1901.)

Citrophen.—This compound is parphenetidin citrate. In the stomach it is broken up into citric acid and parphenetidin. It is a crystalline powder, of a pleasant taste, and soluble in 200 parts of cold water.

¹ Rev. de Chir., May 10, 1901.

² Gaz. degli Osped., 1900, No. 42.

³ Gaz. degli Osped., Feb. 17, 1901.

⁴ Norsk. Mag. f. Lægevidensk., LXII, Jan., 1901.

⁵ Brit. Med. Jour., 1901, No. 2110.

⁶ Monats. a. Ohr. Kehlkopfhasen-Krank., Aug., 1900.

Freyberger¹ recommends it, in doses from 10 to 15 grains, as a valuable and innocuous antipyretic, antirheumatic, and analgesic. Schotten² reports a case of rheumatism in which 15-grain doses of citrophen, thrice daily, speedily caused headache, hot flushes, tinnitus aurium, cyanosis, and profuse perspiration.

Cocain.—Marie and Guillani³ report a case of obstinate sciatica which was promptly relieved by the injection of $\frac{1}{12}$ grain of cocain beneath the spinal dura. Pulls⁴ also reports a case of sciatica successfully treated by intraspinal cocainization. Norris⁵ concludes from a study of the literature on the subject that cocainism is the most insidious of all drug habits, the use of the drug being unaccompanied by disagreeable after-effects; that cocainism is occasionally acquired by the local use of the drug; that cocain is eventually tolerated in extremely large doses (60 grains daily in one case); that a relatively large number of habitués are found in the medical and dental professions; that the continual indulgence in cocain invariably leads to marasmus, with mental moral, and nervous degeneration; that the smallest fatal dose on record is $\frac{1}{3}$ grain hypodermically; that acute intoxication is rarely fatal; and that the few fatal cases have resulted from large doses injected into the urethra and bladder (in one case 5, and in another 6 drams of a 5% solution).

Codein.—Bardel⁶ finds from his physiologic and clinical studies that codein is not hypnotic. It depresses, but does not cause sleep. Attention is directed to the muscular enfeeblement, visual disorders, vertigo, dry mouth, nausea, occipital headache, slow pulse, and sometimes contraction of the pupil, which doses of 3 to 6 grains produce; but even with these amounts there is no tendency to sleep.

Coffee.—Binz⁷ concludes from a series of experiments that the chief effect of coffee and tea is due to caffein, but that the caffein-free distillate of roasted coffee, contrary to the statement of Lehmann, induces muscular irritability and slight psychic excitement, and increases the respiration.

Colchicum.—Schulze⁸ believes that there is no valid reason for retaining the root [eorm] of colchicum in the pharmacopeia, as the seeds are slightly richer in colchicin than the root. Murrell⁹ believes colchicin is far less appreciated than it ought to be. It is a very active remedy, and a dose of $\frac{1}{60}$ of a grain 3 times a day is ample. He recommends a pill composed of calomel, 1 grain, and colchicin, $\frac{1}{60}$ grain, which, given thrice daily, does not purge, but affords speedy relief in gout and in that more common affection termed goutiness. Kuester,¹⁰ from a personal experience, also speaks favorably of colchicin in gout.

Copper.—Nearly 40 years ago Mendini prescribed the salts of cop-

¹ Treatment, Mar., 1901.

² Therap. Monatshefte, 1900, Bd. v, S. 278.

³ Gaz. Hebdom. de Méd. et de Chir., 1901, No. 27.

⁴ La Riforma Med., 1901, No. 44.

⁵ Phila. Med. Jour., Feb. 9, 1901.

⁶ Les Nouv. Rem., 1901, No. 10.

⁷ Centralbl. f. innere Med., Nov. 10, 1900.

⁸ Am. Jour. of Pharm., 1901, vol. LXXIII.

⁹ Med. Press and Circ., Dec. 19, 1900. ¹⁰ Deut. med. Woch., Sept. 26, 1901.

per in chlorosis and amenorrhea. Liégeois¹ states that he began to use them 25 years ago. Of 100 cases of chlorosis, 85 without tuberculosis did well on iron and arsenic, but the 15 with tuberculous symptoms did better on the acetophosphate of copper in doses of $\frac{1}{6}$ to $\frac{1}{3}$ grain, thrice daily. Following Cervello's² experiments in animals, his pupils, Scarpinato and Mercadente, have used copper in cases of anemia with marked increase in the number of red cells. Gindicendrea, who used copper in chlorosis, reports an increase in the hemoglobin and red cells.

Cynoglossum.—Isacondas and Pouloupontos³ state that they have healed 5 cases of ulcerated epithelioma by the application of the powder of the roots, leaves, and flowers of cynoglossum. The applications were made twice daily, and the treatment consumed from 4 to 8 months.

Didymium Salicylate.—Kopp⁴ reports his experience with this drug in surgical and dermatologic practice. He used it in substance or in a 10 % lanolin ointment. In wounds, abscess, and burns of the first and second degree it did good service, proving an unirritating, siccative, and antiseptic application. In burns, however, it was not so useful as ichthyol (5 % ointment), and in dermatologic practice it was unsatisfactory, except in simple intertrigo, hyperidrosis, and excoriations, in which affections it proved very valuable.

Digitalis.—England⁵ recommends a fat-free tincture of digitalis. He claims that it has not the acrid taste of the official tincture, and, unlike the latter, that it remains transparent on dilution with water. Its action, clinically, develops from 15 to 45 minutes more rapidly than that of the official tincture, as it is more readily absorbed. He further maintains that digitoxin is not the chief therapeutic agent in the leaves. Porter⁶ concludes from a study of digitalis as a therapeutic agent that the drug is chemically very complex and that some of its active principles antagonize others; that the various preparations differ widely in composition and action; that the drug's cumulative action is due to its contracting the arterioles, thus shutting off nutrition; that it is both a useful and a dangerous remedy, and one that has a very limited range of usefulness; that it is only of use in lesions of the mitral valve, and then only for a short time; that it should only be used when there is low arterial tension and marked venous engorgement, and as soon as these conditions are overcome, its action should be suspended; that as a diuretic it is only of value when there is low arterial tension, venous engorgement, and obstruction to the exit of blood from the kidneys; that, acting upon the normal kidney and in all diseased conditions in which there is obstruction to the exit of blood from the kidney, it decreases the excretory activity of the renal glands and impairs their nutritive activity; and that if pushed to its fullest extent, it may completely arrest the functional activity of the renal glands. Groedel⁷ believes that very often considerable good accrues from giving digitalis uninterruptedly

¹ Jour. des Praticiens, Apr. 27, 1901.

² Jour. des Praticiens, Jan. 5, 1901.

³ Bull. Gén. de Therap., May 8, 1901.

⁴ Therap. Monatshefte, Feb., 1901.

⁵ N. Y. Med. Jour., vol. LXXIII, 1901, p. 573.

⁶ Am. Med., Apr. 27, 1901.

⁷ Practitioner, 1900, No. 382.

over considerable periods of time, rather than in short courses. He has never seen serious cumulative effects, nor the rapid decline in strength and weight said to occur from the continuous use of the drug, nor does the body speedily become inured to the remedy. As to the forms of cardiac disease in which continuous administration may be recommended, he mentions especially mitral regurgitation. In the last stages of arteriosclerosis, when the high arterial tension has disappeared, he has also found the continuous doses effective. Peacocke¹ states that the best effects from digitalis are observed in mitral disease, with small, frequent, irregular pulse, and dropsy. In dilated and flabby (fatty) heart, with soft and intermittent pulse, such as is often seen in the aged, digitalis is excellent. The writer also advocates its use in uncomplicated aortic stenosis. He believes that it is generally indicated in double aortic disease, though there are instances of sudden syncope following. A pulse between 60 and 70 beats per minute, and increased arterial tension, are, however, contraindications. Finally, he maintains that digitalis, despite theoretic objections, is often beneficial in aortic regurgitation, but that it is advisable, first, to try the effect of nitroglycerin. MacLaren² states that in 22 of 26 patients to whom he administered digitalis an increased excretion of solids and fluids took place, the urea curve rising still higher as the fluid curve approached the normal after the withdrawal of digitalis, the fluid constituents also increasing (in 10 out of 14 cases followed out) after the discontinuance of the drug, though in a less ratio than in the case of solids. In only 5 of the 22 cases were any toxic symptoms produced, vomiting and diarrhea occurring, usually with a slight rise of temperature. He never succeeded in obtaining the "digitalis" pulse, although the drug was pushed further than he would have felt justified in doing in private practice. Diuresis set in, as a rule, on the third day after beginning with digitalis, though with Nativelle's digitalin it frequently began on the second day. The author's results with the infusion were not so satisfactory as with the digitalin granules or the tincture, and he considers most of the beneficial effects obtained to be due to the digitoxin present in the latter two preparations. The dosages he found to be most effective were as follows: Nativelle's granules, 1, thrice daily; tincture, 15 minims, every 4 hours; infusion, 3 drams, every 4 hours. Radcliffe³ reports in a boy 2 years old a case of poisoning from swallowing 5 granules of Nativelle's digitalin, each containing $\frac{1}{250}$ of a grain. The symptoms were semi-unconsciousness, pallor, dilation of the pupils, vomiting, and profuse sweating. The pulse was exceedingly irregular and intermittent, and the respirations were shallow and slow. The patient was given calomel and liberal quantities of brandy and water. He became absolutely comatose, but ultimately made a slow recovery. Hall⁴ reports 3 cases in which delirium and hallucinations followed the use of digitalis, and calls attention to a paper by Duroziez⁵ in which 20 similar cases are recorded.

¹ Dublin Jour., 1900, 340.² Med. Chron., Sept., 1900.³ Brit. Med. Jour., 1901, p. 338.⁴ Am. Med., June 29, 1901.⁵ Gaz. Hebdom. de Méd. et de Chir., 1874.

Digitoxin.—Solomon¹ states that digitoxin is the chief ingredient in digitalis leaves, that it is superior as a diuretic to digitalin, and that its action is more prompt and more certain than that of digitalin. He reports 14 cases of cardiac disease in which he employed digitalin, in doses ranging from $\frac{1}{1000}$ to $\frac{1}{500}$ of a grain, with marked success. He recommends the following solution: Digitoxin (Merk), $\frac{1}{250}$ grain; chloroform, 1½ minims; alcohol (90%), 23 minims; water, to make 4 drams.

Dionin.—Krijevsky² considers dionin (ethyl-morphin hydrochlorate) superior to codein as a sedative, analgesic, and hypnotic. Used hypodermically in doses of $\frac{1}{6}$ to $\frac{5}{6}$ of a grain the sedative effect becomes noticeable in about 15 minutes. Cough is favorably influenced in both acute and chronic conditions. No untoward effects have been noticed. Boernikoell,³ of Senator's clinic, has employed dionin in 200 cases. According to the author, it rendered excellent service in allaying cough in pulmonary affections. It was administered by the mouth or hypodermically in doses of from $\frac{1}{4}$ to $\frac{3}{4}$ grain. Its analgesic action was pronounced in gynecologic cases, acute rheumatism, and tabes. No unpleasant after-effects were produced by the remedy. Majewsky⁴ speaks favorably of dionin hypodermically in mania during the stage of excitement. Graefe⁵ publishes a report on 200 eye cases treated with dionin. He concludes that favorable results may be looked for in all diseases of the cornea, with the exception of those associated with trachoma; in diseases of the conjunctiva, in iritis, in iridocyclitis, and in diseases of the vitreous humor. Ingals⁶ prefers 2% instead of 5% solutions, as the latter cause considerable smarting. He has found it a useful analgesic in iritis. Daxemberg⁷ has obtained excellent results with dionin in affections of the cornea, except in cases of recent injury. Under its influence he has seen the cornea clear up in a short time, old cicatrices become less prominent, and exudations in the anterior chamber disappear entirely.

Dormiol.—This drug was formerly called amylene-chloral. It is a combination of chloral hydrate and amylene hydrate. It is marketed in 50% solution, the dose of which is from 15 to 60 minims in water. Brownrigg,⁸ after 250 trials with this drug in insane subjects, concludes that it does not cause gastric disturbance nor depress the respiration and circulation. It induces sleep in the severest grades of exaltation or depression. In 37.6% sleep followed in 15 minutes; in 43.2%, in from 15 to 30 minutes. The average duration of the sleep was 5 hours. According to the author, it does not excite disagreeable after-effects, and in its rapidity of action it is not surpassed by any other hypnotic taken internally. Goldmann,⁹ Claus,¹⁰ and Tendlaw¹¹ also report favorable results with dormiol.

¹ N. Y. Med. Jour., Feb. 9, 1901.

³ Klin.-therap. Woch., No. 17, 1900.

⁵ Dent. med. Woch., Bd. XXVI, S. 9.

⁶ Squibb's Ephemeris, 1901.

⁷ Woch. f. Therap. u. Hyg. des Aug., No. 32, 1900.

⁸ Boston M. and S. Jour., July 18, 1901.

¹⁰ Therap. Gaz., Feb., 1901.

² Thèse de Paris, 1900.

⁴ Vratsh, vol. XXII, No. 6.

⁹ Merck's Arch., vol. II, p. 394.

¹¹ Med. Times, Mar., 1901.

Dryopteris Spinulosum.—Wolff¹ reports favorable action without untoward effects from the use of the ethereal extract of this drug in 6 cases of tenia in children aged from 10 months to 13 years.

Duboisin.—Lalaune² concludes that the sulphate of duboisin administered by the mouth produces hardly appreciable effects, except in dangerous doses; that it is necessary to be sure that the preparation has not undergone chemie change; that it acts as a sedative, promptly and durably for physical agitation, but not for mental excitement; that the daily dose should not exceed $\frac{1}{10}$ of a grain, the patient being watched until all danger of poisoning has passed; and that the remedy should not be used without having at hand a solution of pilocarpin with which to facilitate elimination should symptoms of poisoning arise.

Epigæa.—Aaron³ recommends Epigæa, or trailing arbutus, in doses of 1 dram of the fluid extract after meals, in eructations of tasteless or offensive gases. He does not know how the drug acts, but states that he has had many prompt and happy results with it in some very obstinate cases.

Toxins of Erysipelas and Bacillus Prodigiosus.—Coley⁴ publishes a report of the after-histories in 24 cases of inoperable malignant tumors treated with the mixed toxins of erysipelas and Bacillus prodigiosus. Of these, 16 (all sarcomas except 1 case of epithelioma) have remained well from 3 to 8½ years. Two recurred after 3 and 8 years respectively. The author believes that the toxins may be given for long periods in moderate doses without harm; that the risks are practically *nil* if the proper precautions are observed. In upward of 200 cases he has had but 2 deaths, both of which occurred more than 5 years ago. The method is advised only in sarcoma, and only in inoperable cases. He has had no success in melanotic sarcoma and lymphosarcoma. He believes that the only cases of carcinoma in which the toxins are likely to prove of much value are those in which they are used after primary or secondary operation, as a prophylaxis against recurrence. Dennis,⁵ in commenting upon the treatment of malignant disease, states that he has personally seen but temporary benefit from Coley's treatment, and in no case a cure.

Erythrol Tetranitrate.—Huehard⁶ has employed this drug in some 120 patients, and has found it singularly free from the unpleasant effects of nitroglycerin, such as pulsating temporals, etc. He has found it very serviceable in lowering arterial tension in arteriosclerosis, chronic nephritis, gout, and tabetic crises. It has the great advantage of mild prolonged action. It commences to act in from 15 to 45 minutes, and, if continued in from 1- to 2-grain doses, 4 or 5 times a day, it keeps the vessels in a state of reduced tension. Mattirio⁷ found erythrol tetranitrate very useful in doses of $\frac{1}{2}$ grain, in a case of lead-poisoning with high arterial tension. The pain ceased with the reduction of

¹ Arch. f. Kinderh., 1901, Bd. XXXI, S. 74.

² Jour. de Méd. de Bordeaux, 1900, No. 23.

³ Phila. Med. Jour., May 25, 1901.

⁴ Am. Therapist, Sept., 1901.

⁵ Jour. Am. Med. Assoc., Oct. 19, 1901.

⁶ Bull. de l'Acad. de Méd., 1901, vol. LXV.

⁷ Gaz. degli Osped., 1901, No. 63.

blood-pressure. [This is probably the most serviceable of the nitrates for prolonged use.]

Ether.—The committee of the British Medical Association appointed to study the relative effects of the anesthetics commonly employed reported¹ that under ether complications are more frequent with males than with females, but with the former they are generally slight, ether being rather more dangerous for females than for males. Ether, when employed throughout or preceded by nitrous oxid or by A. C. E. mixture, is singularly free from danger in healthy patients. Minor troubles due to laryngeal irritation and increased secretion are more common under ether and “gas and ether” than under chloroform and its mixtures. Struggling is more common with ether when given alone than with other anesthetics, but it rarely leads to danger. After-vomiting is more common with ether than with other anesthetics, but it is usually transient. Bronchitis is much more common after ether than after chloroform. DaCosta and Kalteyer² report upon 50 cases in which blood examinations were made after etherization. They conclude that ether always causes blood destruction, and that those who affirm the contrary have been misled by the blood concentration which results from the preliminary treatment, and which is often added to by the sweating during the anesthetic state. The authors maintain that the color-index always falls, and that the number of corpuscles increases. They urge that whenever possible one or two examinations should be made before ether is administered. If less than 50 % of hemoglobin is present, anesthesia is dangerous, and should only be given as a matter of absolute necessity. Less than 40 % of hemoglobin is regarded as the lowest justifiable limit. Pastena³ reports two cases of hysteric hiccough cured by ether narcosis. In both instances the symptom had been rebellious to other methods of treatment.

Ethyl Bromid.—Sondern⁴ states that for patients between 3 and 16 years of age this drug has no equal for short operations. The drug, however, must be pure; it should be colorless and of sweetish odor. A yellowish tint indicates the presence of bromin. The entire quantity (for a child 5 to 10 grams, for an adult 10 to 20 grams, never more) is given from a mask admitting the smallest possible quantity of air. Anesthesia occurs in from 20 to 40 seconds, and in any case the operation is begun at the end of a minute at most. The mask is removed, and not reapplied. Anesthesia lasts for 2 minutes and is followed by no unpleasant sequels. According to the author, the fatal cases recorded can be traced to the use of ethylene bromid; the use of an old preparation; the use of the drug in repeated small doses; the continuation of administration for longer than 1 minute; and repeated administration. The mask should never be applied more than twice at a sitting.

Ethyl Chlorid.—Wade⁵ states that the death-rate from this drug as a general anesthetic is 1 in 11,207 cases. His method of adminis-

¹ Lancet, Jan. 26, 1901.

² Am. Med., May 18, 1901.

³ Treatment, Jan., 1901.

⁴ N. Y. Med. Jour., June 9, 1900.

⁵ Med. Rec., Apr. 6, 1901.

tration consists in spraying it onto a piece of gauze held in a tin or vulcanite funnel which fits the patient's face. Narcosis is produced in from 1 to 2 minutes after 10 cc. has been used. Narcosis is reached when the pupils begin to contract, the muscular contractions to abate, and the breathing becomes slightly stertorous. The author believes it to be pre-eminently the best anesthetic for minor surgery, its advantages being safety, rapidity of narcosis and recovery, small cost, and portability. Pollocon and Nové-Josserand¹ and Ware² also recommend ethyl chlorid as a general anesthetic. Ware thinks it is specially useful to cut short the agonies of the early stages peculiar to ether and chloroform. McCardie³ reports 26 cases of ethyl-chlorid anesthesia. In a case in which the heart, kidneys, and liver were extensively involved, the patient died an hour after the administration; in another case the drug caused a rash, and in a third case the muscular excitement made anesthesia and operation impossible. The longest operative anesthesia was from 16 to 17 minutes, and the result, according to the author, was in every way excellent. Dethlefsen⁴ reports a severe case of lupus in a girl of 29 years, of 12 years' duration, in which there was complete restoration of skin without loss of substance after 10 weeks' treatment with ethyl chlorid locally without scraping. During the first week the freezing was done daily; later, every second or third day; and toward the end of the treatment, once or twice a week. The freezing was followed by hyperemia, serous transudation, and formation of a crust. The crust was removed before the next freezing, but only so far as could be done without lacerating the parts.

Eugoform.—This is an odorless white powder, formed by the action of formaldehyd on guaiacol and subsequent acetylation. Maass⁵ finds that as a dusting-powder for wounds in children, and where there is a tendency to eczema around the wound, it is of considerable value.

Euphthalamin.—This compound is a derivative of amygdalic acid, and is chemically related to B-eucain. According to Cipriani,⁶ it causes mydriasis by paralyzing the terminations of the oculomotor nerve. Dilatation of the pupil commences after 20 to 30 minutes, and disappears in from 3 to 6 hours. The corneal epithelium is affected by a 10% solution, but not by weaker solutions. It does not increase intraocular tension, disturb accommodation, nor produce disagreeable after-effects. The author concludes that euphthalamin in from 2% to 5% solutions is perfectly harmless; and that it meets the need of long-continued mydriasis, which is so important for ophthalmoscopic examinations. Schultz⁷ also considers euphthalamin an excellent mydriatic for diagnostic pupil extension.

Eupyrin.—Overlach⁸ recommends eupyrin as a stimulating antipyretic. It is a chemie compound of ethyl carbonate of vanillin and paraphenetidin, and occurs in yellowish, tasteless crystals, which are

¹ Rev. de Chir., July, 1900.

³ Lancet, July 20, 1901.

⁵ Deut. med. Woch., May 16, 1901.

⁷ Therapist, Feb. 15, 1901.

² Med. News, Aug. 3, 1901.

⁴ Treatment, Apr., 1901.

⁶ Wien. med. Woch., No. 46, 1900.

⁸ Centralbl. f. innere Med., Nov. 10, 1900.

sparingly soluble in water. According to the author, experiments on dogs showed that 40 times the dose required for man caused no dangerous symptoms. In more than 50 cases of pyrexia in man it caused no unpleasant symptoms, but reduced the temperature to normal on an average within 3 hours. The usual dose is about 23 grains. The stimulating properties of the drug are said to be due to the vanillin. Eupyrin is an inferior analgesic.

Euquinin.—Mori ¹ reports that euquinin in doses of from 4 to 8 grains a day is capable of preventing malaria, especially when treatment is begun 4 or 5 months before the usual malarial season. Of 89 individuals under similar conditions only 5 of 42 who had been under treatment contracted malaria, while 39 of 47 suffered who were not so treated. Manson ² also speaks favorably of euquinin as a prophylactic remedy.

Europhen.—Thomas ³ states that in europhen we have an iodine compound fully as efficacious as iodoform in surgery, and internally a most satisfactory means of giving iodine. Owing to its low specific gravity and its twofold antiseptic power, due to the setting free of cresol and nascent iodine, it would seem, according to the author, that at last we have a safe and reliable antiseptic.

Ferropyrin.—Braila ⁴ has used this remedy (a combination of ferric chloride and antipyrin) successfully as a hemostatic in epistaxis, wounds, metrorrhagia, and menorrhagia. In 65 uterine cases in which it was used topically it succeeded in 59. In the gynecologic cases the author used it in a 15% to 20% solution by means of a syringe. Toff ⁵ has also employed the drug successfully as a local hemostatic.

Fersan.—Folkel ⁶ speaks well of fersan, an acid-albumin obtained from the red blood-cells. The advantages claimed for this compound are its high percentage of phosphorus, the absence of gastric disturbance, and the rapidity with which the impoverished blood under its influence reaches the normal.

Formaldehyd.—Abba ⁷ summarizes the results of an experimental research as follows: (1) Formaldehyd disinfects surfaces only when these are quite smooth or polished. (2) It cannot be relied on when there is perceptible dust in the room. (3) Floors, frames, ledges, cornices, etc., are not disinfected. (4) The surfaces of upholstered furniture are only rarely and not uniformly disinfected. (5) Only smooth or polished walls are disinfected, and not reliably. (6) It is recognized on all hands that formaldehyd does not penetrate bedding. (7) Disinfection with formaldehyd must be reinforced by sublimate and steam if it is to be thorough. (8) Disinfection with formaldehyd requires at least 10 hours for each room, necessitating special housing arrangements for poor people who come from infected rooms. As a rule, especially where ventilation is difficult, the rooms are not inhabitable for 24 hours. (9) The process is not

¹ *Centralbl. f. Bakt.*, 1901, No. 20, S. 786.

² *Practitioner*, Mar., 1901.

³ *Am. Med.*, Aug. 3, 1901.

⁴ *Med. Press*, Sept. 9, 1900.

⁵ *Wien. klin. Woch.*, July 26, 1900.

⁶ *Münch. med. Woch.*, Oct. 30, 1900.

⁷ *Centralbl. f. Bakt.*, Bd. XXVIII, No. 12 u. 13, 1900.

cheaper than others. On account of the variability and inequality of its effects, it cannot be considered of practical utility as a disinfectant for general use. Jordan ¹ states that the **irritation caused by formalin** may be overcome to a great extent by using glycerin instead of water as a medium. For 10 months he used successfully a mixture of formalin in glycerin (from 1 % to 4 %) as an application to the throat, as a mouth-wash, as an application to the skin, and as a urethral injection. The author believes that in follicular tonsillitis formalin is almost a specific. Demidoff ² has used formaldehyd with excellent results in **favus**. After removing as many crusts as is possible, the remaining ones are then painted with a 5 % to 10 % solution of formaldehyd. The scalp is then covered with a layer of cotton and gauze to prevent evaporation and to render the action of the drug more lasting. Daniel ³ recommends painting warts or corns with pure formalin morning and evening, or more frequently, allowing the fluid a few minutes to be absorbed. The hardening action of the drug very soon effects shrinkage, and the warts or corns may, after a week or two, be lifted off bodily. Thompson ⁴ reports the case of a man, aged 50, suffering from a **sarcoma** of the posterior wall of the nasopharynx, in which injections of formalin proved remarkably successful. The patients' general condition forbidding operation, 25 minims of a 0.5 % solution of formalin was injected into the tumor twice a week. The blood-supply of the tumor being cut off by the injections, removal by forceps soon became possible. After 14 months there had been no recurrence. Lander ⁵ uses for **mucopurulent and follicular inflammation of the conjunctiva** a solution of formalin of the strength of 1:2000. In ophthalmia neonatorum he uses a stronger solution at first. In blepharorrhea of the lacrimal sac he has found formalin more satisfactory than silver nitrate. For infected ulcerations of the cornea the lesion may be touched daily with a solution of 1:500, or even 1:200. For disinfecting lids and lashes prior to operation the author uses 1:3000, and for cleaning the conjunctiva, 1:4000. Ward ⁶ recommends 1 % solutions of formalin in suppurative otitis media. He states that under its use fetid odor quickly disappears, the discharge rapidly ceases, the formation of granulations is prevented, healing is promoted, and bone necrosis is retarded. Gerstenberg ⁷ has obtained good results in **climacteric hemorrhage** and in uterine hemorrhages of unknown origin from intra-uterine applications of a 40 % solution of formaldehyd.

Muthu ⁸ states that he has succeeded in curing 7 of 15 cases of **tuberculosis** with inhalations of formaldehyd. Hoffner ⁹ reports 10 cases of tuberculosis in which he used formalin inhalations with unfavorable results. Beerwald, ¹⁰ while denying any bactericidal influence of the drug in tuberculosis, believes that inhalations lessen cough and secretion,

¹ Lancet, Feb. 16, 1901.

³ Therapist, Feb. 15, 1901.

⁵ Cleveland Med. Gaz., 1900, vol. xv.

⁷ Centralbl. f. Gynäk., 1900, No. 34.

⁹ Therap. Monatshefte, Feb., 1901.

² Merck's Arch., Apr., 1901.

⁴ Laryngoscope, Sept., 1900.

⁶ Am. Med., June 15, 1901.

⁸ Phila. Med. Jour., Aug. 31, 1901.

¹⁰ *Ibid.*

sharpen the appetite, and promote sleep. Maguire¹ advocates the employment of a solution of formaldehyd directly **injected into the veins as a remedy for tuberculosis**. He uses a solution of 1 part of formic aldehyd to 2000 parts of normal salt solution, introducing 50 cc. at one time. The results are reported of 50 observations, in all of which there was diminution of expectoration, decrease of fever, and in several disappearance of bacilli from the sputum.

Tunnicliffe and Rosenheim² write, concerning the use of formaldehyd as a **food preservative**, that, added to milk in the proportion of 1:5000 or to the entire aliment in the proportion of 1:9000, it has no appreciable influence on healthy children, but with debilitated children some interference is shown. With these, the quantity of urine and dry feces is increased. The excretion of lecithin is decreased. In no case was any unfavorable influence on the general health noticed, notwithstanding the fact that the proportion of formaldehyd used in the milk was much larger than required for ordinary preservation. According to the authors, the drug exerted no antiseptic effect upon the intestinal contents. Glover³ reports the case of a young woman in whom the use of a lotion containing formalin for the hair induced a severe and general **urticarial eruption**. Zorn⁴ reports the case of a man who by mistake had **swallowed 30 cc. of formalin**. He had dyspnea, cyanosis, vertigo, nausea, vomiting, and a feeling of burning in his mouth and stomach. Absolute anuria persisted for 24 hours, the bladder remaining empty. The bowels were loose, with much mucus. The urine passed later contained albumin and casts. His pulse was small and rapid. The stomach was washed out, and the patient recovered within a week. Klüber⁵ reports the case of a man, aged 47 years, who took a considerable quantity of formalin by mistake (amount not stated). The symptoms consisted of coma, lasting for several hours; anuria, persisting for 19 hours; redness of the conjunctiva and pharynx; and the presence of formic acid in the urine. The **chemic antidote** for formalin-poisoning is ammonia water or spirit or ammonium acetate, which combines with formaldehyd to form the harmless hexamethylene-tetramin, known also as urotropin.

Gasterin.—Le Gendre,⁶ who first suggested the gastric juice of dogs in therapeutics, has used it in chronic dyspepsia when there was little or no pepsin present, with good results. The dose was from 4 to 6 tablespoonfuls daily. Sarrade, Daude, Rendu, and Fremont⁷ also report favorably on gasterin in various gastric affections. Mathieu and Laboulais⁸ report in full 9 out of the 15 cases in which they have used gasterin. There was hypochlorhydria in all. Two patients who had hypochlorhydria could not take the preparation, as it caused burning, eructation, and vomiting. The authors believe that when no improvement follows its use, in cases with marked hypochlorhydria, cancer is to

¹ Treatment, Mar., 1901.

² Jour. of Hyg., Apr., 1901.

³ Brit. Jour. of Dermat., Apr., 1901.

⁴ Münch. med. Woch., Nov. 13, 1900.

⁵ Münch. med. Woch., Oct. 2, 1900.

⁶ Bull. et Mém. de la Soc. Méd. des Hôp. de Paris, June 27, 1901.

⁷ *Ibid.*

⁸ Bull. et Mém. de la Soc. Méd. des Hôp. de Paris, July 4, 1901.

be suspected. Gasterin acts not so much by replacing gastric juice as by stimulating pancreatic secretion. Finkelstein¹ also reports favorable results with gasterin.

Gelatin.—Grunow² reports 27 cases of severe internal hemorrhage treated by the subcutaneous injection of gelatin, with only 1 death. In 7 cases the hemorrhage was from the lung; in 8 from the intestines (6 typhoid fever, 1 leukemia, 1 purpura); in 7 from the stomach (5 ulcer, 1 cancer, 1 hemophilia); in 2 from the bladder; in 2 from the kidney; and in 1 from an aneurysm. In the overwhelming majority of cases the hemorrhage was arrested, transiently or permanently. The author recommends the injection of 2 grams daily into each thigh, dissolved in 100 grams of salt solution, using a bulb instead of a syringe, with the air filtered through cotton. Castaing³ reports upon the value of gelatin in 27 cases of **hemoptysis**, 5 cases of bleeding hemorrhoids, and several cases of hematemesis. In 74% of the cases of hemoptysis the bleeding ceased after 1 injection, in 3 after 2 injections, and in 1 after 3 injections. The author used a 2% solution in artificial serum, of which he injected 75 minims to 2 ounces according to the severity of the bleeding. Demange⁴ reports 3 cases of bronchiectasis with profuse hemorrhage which were successfully treated with injections every other day of 5% gelatin solution, of which 50 cc. was given. Schwabe⁵ reports a case of hematuria which was arrested within 5 days by injections (6 drams) of 2% gelatin solution, and the administration by the mouth of a pint of 10% gelatin solution daily. Hahn⁶ reports a case of hematuria due to hemophilia in which, after other methods had failed to stop the hemorrhage, the patient was given large quantities of gelatin with his food. The result was excellent. Sailer⁷ reports several cases of hemorrhage treated successfully with gelatin. He concludes from his study of the literature and from his own experience that gelatin increases the coagulability of the blood, whether applied locally, taken internally by the mouth, or injected subcutaneously or intravenously. If the technic is perfect, the injections are practically painless. The solution should be thoroughly sterile; the dose should vary from 1 to 3 grams of pure gelatin, or, if given by the mouth, from 1 to 300 grams daily. It is of advantage in any form of local hemorrhage, such as epistaxis, hemorrhoids, or injuries. It checks certain forms of internal bleeding, such as hemoptysis, hematemesis, metrorrhagia, and melena neonatorum. It appears to be our best remedy in **hemophilia**, and to be of great advantage in purpura and in hemorrhagic forms of infectious diseases. It appears to be contraindicated in only one condition, viz., acute nephritis. Locally, 5% to 10% solutions in normal salt solution are employed, and 1% or 2% for subcutaneous injection. About 10 ounces of the 1% solution is usually required. As the pain on injection is proportionate to the amount of

¹ Centraltbl. f. d. gesamte Therap., XVIII, No. 12.

² Berlin. klin. Woch., Aug. 12, 1901.

⁴ Rev. Méd. de l'Est., July 15, 1901.

⁵ Therap. Monatshefte, 1900, H. VI, S. 311.

⁶ Münch. med. Woch., Oct. 16, 1900.

³ Klin.-therap. Woch., vii, No. 5.

⁷ Therap. Gaz., Aug. 15, 1901.

turbidity, it is important to clarify the solution thoroughly with white of egg. Sterilization is accomplished by heating in an ordinary steam sterilizer 15 minutes for 3 successive days. Mariani¹ also speaks favorably of the hemostatic action of gelatin. Racchi² claims that 10 drams of a warm 2% solution of gelatin in normal salt solution injected into the rectum is more rapidly absorbed than if given hypodermically. Its action is manifest in from 5 to 10 minutes, and lasts about 6 hours. Grenet and Piquard³ report 1 personal observation on the gelatin treatment of aneurysm and analyze 100 cases in literature. The cases are divided into 4 groups: In the first (11 cases) the observations are without value; in the second (5 cases) there were grave sequels which may have been due to treatment; in the third (25 cases) the treatment had no apparent influence; in the fourth (59 cases) there was more or less temporary or permanent improvement. Sörgo⁴ reports 6 cases of aortic aneurysm treated with gelatin. The injections, each consisting of from 100 to 150 grams of the solution (preferably 4% or 5%), were made into the thigh or abdominal wall at intervals of from 3 to 5 days. The author concludes that the treatment is useful in sacular aneurysm, but not in cases of simple dilation of the vessel. Geraldini⁵ reports 4 cases of aortic aneurysm in which he made use of the gelatin treatment with great apparent benefit. Golubinin,⁶ of Moscow, has used gelatin in 8 cases of aortic aneurysm. Of these, 4 died in a short time, and the other 4 were lost sight of; in 3, however, of the latter group the injections produced no effect. The author concludes that the treatment has not fulfilled the expectations that had been founded on it.

Gomenol Oil.—This is a terpinol derived from *Melaleuca viridiflora*. Tozzi⁷ states that injections of this oil prove remarkably efficacious in whooping-cough. A 20% solution is injected deeply into the gluteal region, commencing with 30 minims and not exceeding 2 drams. The injections should be made daily, and continued for 4 or 5 days after the entire disappearance of the paroxysms. According to the author, the injections are but slightly painful. Leroux and Pasteau⁸ report 40 cases of pertussis in which from 5 cc. to 10 cc. of a 5% oil was injected into the gluteal muscles. The results were generally favorable.

Guacamphol.—Stadelmann⁹ has found this drug in doses of from $\frac{1}{3}$ to 1 grain useful in controlling the night-sweats of tuberculosis.

Guaiacol.—Goldberg¹⁰ has used guaiacol with satisfaction in 25 cases of epididymitis. He applied an ointment of guaiacol (75 grains) and lanolin (150 grains) every 12 hours until the whole quantity was used in the course of 3 or 4 days. Salol was also given internally. Of the patients, 15 were sick less than 3 days. The remedy promptly relieved the pain and reduced the swelling. Allahverdiantz¹¹ states that he has obtained excellent results from the local application of solutions

¹ H Policlínico, Jan., 1901.

³ Arch. Gén. de Méd., 1901, 78.

⁵ Gaz. degli Osped., Feb., 1901.

⁷ La Riforma Med., 1900, No. 156.

⁹ Deut. med. Woch., June 27, 1901.

² Gaz. degli Osped., 1900, No. 114.

⁴ Zeit. f. klin. Med., 1901, Bd. XLII, H. 1 u. 2.

⁶ Phila. Med. Jour., Dec. 29, 1900.

⁸ Bull. Méd., June 13, 1900.

¹⁰ Centralbl. f. innere Med., Apr. 6, 1901.

¹¹ Bull. Gén. de Thérap., Feb. 15, 1901.

of guaiacol, more or less concentrated, in varices, hemorrhoids, and hydrocele.

Guaiacol Carbonate.—Holsti ¹ concludes, from an experience with this drug in 11 cases of tuberculosis, that it is absolutely worthless, and disadvantageous when dyspeptic symptoms are prominent.

Guaiacol Cacodylate.—Barbary ² stated at the British Congress on Tuberculosis that he had obtained lasting and rapid benefit in the treatment of tuberculosis from the injection every other day of sterilized oil containing cacodylic acid and guaiacol. The dose injected was 10 grams of oil containing 0.035 gram of cacodylic acid and 0.05 gram of guaiacol.

Hedonal.—This substance is methyl-propyl-carbinol-urethane. It appears as colorless crystals, of a peculiar burning, mint-like taste, insoluble in cold water, but soluble in 50 % alcohol. The dose is from 7 to 30 or even 45 grains. According to Nawratszki and Arndt, ³ after a full dose sleep follows in about 30 minutes and lasts from 2 to 9 hours. There is no change in pulse, temperature, or respiration, but there is a marked increase in the flow of urine. Schüller ⁴ employed the drug in 21 cases. In 5 the results were negative, in 7 the results were uncertain, and in 9 the results were excellent. The author is inclined to believe that its best effects are produced in mild cases of insomnia, and states that it can be used alternately with trional, even for prolonged periods. Müller ⁵ has employed hedonal in 29 patients, and states that on account of its insolubility and persistent taste it is best given in wafers or capsules. He concludes that for mild cases of insomnia it is a valuable hypnotic, without unpleasant by-effects, but its high price makes it almost prohibitory. He compares it, for asylum work, with paraldehyd, in favor of the latter. Combemale and Crespin ⁶ have used it in 20 cases of insomnia. In 6 cases it was unsuccessful, because the insomnia was due to pain or some somatic cause. The authors regard it as a valuable hypnotic in insomnia from mental causes. Brownrigg ⁷ has found hedonal innocuous, but only applicable as a somnifacient to mild forms of insomnia.

Heroin.—Hyams ⁸ reports his experience with heroin in various conditions. He maintains that the drug is indicated in coughs of all kinds, whatsoever the cause, in dyspnea, and in all catarrhal conditions of the respiratory tract. In acute bronchitis the combination of heroin with ipecac is said to be particularly effective, and in chronic bronchitis and asthma the addition of potassium iodid is advocated. In a case of diabetes it was used without effect. In tuberculosis it is regarded by the author as one of the best remedies with which to combat dyspnea, cough, and night-sweats. Geiss ⁹ speaks favorably of heroin in doses of $\frac{1}{12}$ grain as a somnifacient in the restlessness of tuberculosis. Lazarus ¹⁰ also praises heroin as a sedative and analgesic.

¹ Finska l k. Handlung, 1901, vol. XLII.

³ Therap. Monatshefte, 1900, H. VII, S. 372.

⁵ M nch. med. Woch., Mar. 5, 1901.

⁷ Boston M. and S. Jour., July 18, 1901.

⁹ N. Y. Med. Jour., Dec. 1, 1900.

² Phila. Med. Jour., Aug. 10, 1901.

⁴ Wien. klin. Woch., June 7, 1900.

⁶ L'Echo M d. du Nord., July 21, 1901.

⁸ Med. News, Dec. 1, 1900.

¹⁰ Boston M. and S. Jour., Dec. 13, 1900.

Homatropin.—Jackson ¹ has found homatropin to be a satisfactory and reliable cycloplegic, both for children and those who have reached the age of 40 years. He recommends a 2.5% or 3% solution. Of this, a small drop is to be instilled at the upper margin of the cornea every 5 minutes until 4 or 5 drops have been introduced. Homatropin, according to the author, far more rarely induces intoxication than other cycloplegics.

Honthin.—Frieser ² has used this compound (keratinized albumin tannate) in 38 cases (26 children, 12 adults) of diarrheal disease with excellent results. He believes that it is half as powerful again as tannalbin, and that, owing to its more intimate chemie composition, a much larger amount of the drug reaches the large intestine unchanged. He prescribes the drug in powders to adults in doses of from 8 to 15 grains, 3 or 4 times a day; to children in single doses of from 4 to 8 grains, thrice daily. It is quite tasteless, and in the author's experience was always well borne. Reichelt ³ also pronounces honthin a safe and reliable intestinal astringent.

Hydrocyanic Acid Gas.—Fulton, ⁴ as the result of his experiments, suggests this agent as a reliable germicide for the disinfection of houses and ships. In germicidal power it appears to be inferior to formaldehyd, and, like other gaseous agents, it has no marked power of penetration. It is somewhat more expensive than formaldehyd, and it is undoubtedly far more poisonous. The destructive effects of hydrocyanic acid gas on animal life, however, point to its usefulness in disinfection after plague, yellow fever, and malaria. According to the author, it has been extensively used for destroying vermin in flour mills, ships' holds, railway cars, and tobacco warehouses. The gas is best generated by the action of sulphuric acid (acid 1.5 parts, water 2.25 parts) on potassium cyanid (1 part). About 1 kilogram of cyanid is required for each 1000 cubic feet of air space. The poisonous properties of the gas make it necessary to exercise caution in its use and to ventilate well on the expiration of the period of exposure.

Ichthoform.—This is a compound of ichthyol and formaldehyd. It occurs as a blackish-brown, amorphous, almost odorless and tasteless powder, practically insoluble in the usual solvents. Aufrecht ⁵ concludes from his investigations that ichthoform is a valuable intestinal antiseptic, suitable for all conditions associated with intestinal fermentation. He holds that it is superior to iodoform for external use in that it has greater disinfectant power and is relatively nontoxic. Polacco ⁶ has found ichthoform useful in average daily doses of from 15 to 30 grains in intestinal tuberculosis, typhoid fever, and dysentery. Goldman ⁷ also thinks well of ichthoform, both as an internal and as an external antiseptic.

Ichthyol.—Douglass ⁸ believes that ichthyol is a drug that gives

¹ Ann. Ophthal., Jan., 1901.

² Therapist, Jan. 15, 1901.

³ Wien. klin. Woch., Aug. 30, 1900.

⁴ Am. Med., May 11, 1901.

⁵ Merck's Arch., Nov., 1900.

⁶ Il Boll. Clin.-Scientif. d. Poliambul. di Milano, June, 1900.

⁷ Centralbl. f. d. gesammte Therap., 1900, II. 9, S. 513.

⁸ Post-Graduate, June, 1900.

the greatest relief in atrophic rhinitis. Nearly all authorities agree that it is the best remedy for the relief of the disagreeable symptoms and the best stimulant for the mucous membrane. Douglass employs ichthyol in three ways: First, by means of a 10% to 20% aqueous solution applied on a large pledget of cotton and introduced into the nares, and allowed to remain for from 15 to 30 minutes, when an oily spray is used; secondly, when there is ulceration, pure ichthyol is rubbed in for 4 or 5 minutes; thirdly, the drug is used in the form of a salve (ichthyol 40 grains, menthol 5 grains, vaselin 1 ounce); the patient is directed to insert a piece as large as a bean and then to snuff it back. Strat¹ found that ichthyol always gave good results, whether applied externally to the abdomen or by tampons and injections to the vagina and uterus. Potilov² recommends ichthyol enemata in the treatment of **dysentery**. He uses for each injection 6 drams of the drug dissolved in about 27 ounces of water. The patient takes at the start a dose of castor oil, and the injections are then given every other day, an endeavor being made to make the liquid reach as high up in the bowel as possible. Brownlie³ is convinced that ichthyol is the most valuable drug in eczema, acne, and other superficial inflammatory conditions of the skin. In acute cases he employs it in from 2% to 5% strength; in chronic cases from 5% to 10% strength; and in acne vulgaris, in from 10% to 25%. At the same time he administers the drug internally. He has not found it valuable for the relief of itching. Kamneff⁴ reports having used a 12% to 20% ointment of ichthyol in the treatment of a number of cases of **smallpox** with most excellent results. Marked amelioration of all the symptoms occurs from the first day of its use. The duration of the disease is shortened and no marks are left on the face or elsewhere. Slevin⁵ has obtained excellent results from the following combination of ichthyol and lead iodid in deep-seated inflammation: Ichthyol and lead iodid, of each, 45 grains; ammonium chlorid, 10 grains; petrolatum to make 1 ounce.

Iodipin.—This is an addition product of sesame oil and iodine (10% or 25%). Nobl⁶ employed it in 20 cases of tertiary syphilis with most excellent results. In primary syphilis it had no effect. The author used the 25% preparation, varying the frequency and the dose according to the severity of the case. In no instance were any signs of iodism apparent, even in cases in which more than 3 ounces was injected in a short time, nor were there any other disagreeable effects. The pain accompanying the injection is but moderate. The author also states that the elimination of the iodine from the body is very slow—that is, that iodipin remains in contact with the tissues for a long time, exerting all the while its beneficial effects. Hall⁷ states that iodipin (10%), in daily doses of from 1 to 6 drams, may be used with benefit in asthma, bronchitis, emphysema, pleurisy, glandular inflammation,

¹ Centralbl. f. d. gesammte Therap., XVIII, No. 12.

² Les Nouv. Rem., vol. XVII, No. 2.

³ Lancet. Nov. 24, 1900.

⁴ Theap. Monatshefte, Dec., 1900.

⁵ N. Y. Med. Jour., Mar. 9, 1901.

⁶ Festschrift gewidmet Prof. J. Neumann, 1900.

⁷ Med. Chron., Apr., 1901.

and tertiary syphilis. Sessions¹ and Möller² also speak favorably of iodipin (25%) in tertiary syphilis. The latter finds the injection somewhat painful. Croftan³ has used hypodermic injections of iodipin in 27 cases of pulmonary tuberculosis with uniformly good results. Beginning with 1 drop dissolved in 30 drops of sterilized oil, the injections were gradually increased 1 drop each day. So soon as improvement was apparent the dose being given at the time was maintained for from 30 to 60 days; more than 60 minims a day was not given. No discomfort or inflammation followed the injection.

Iodoform.—Vacher⁴ has used with success tracheal injections of iodoform in ether in the treatment of laryngeal tuberculosis. Two cc. of the following mixture is employed: Ether containing iodoform to saturation, 100 grams; guaiacol, 5 grams; eucalyptol, 2 grams; menthol, 1 gram. Anschütz⁵ reports a case of iodoform-poisoning in a man, aged 30 years, after a third injection of 100 cc. of a 10% iodoform glycerin emulsion into a psoas abscess. The symptoms were slight vomiting on the first day, progressive somnolence beginning on the ninth day, general acne, crust formation on the nose, agglutination of the eyelids, increased reflexes, stertorous respiration. Large quantities of the drug were found in the urine. Death resulted.

Iodol.—T. M. Tyson⁶ states that for the last two years he has been using iodol by inunction for incipient tuberculosis. This preparation contains 88% of iodine, or nearly three times as much as europen. While no cures were effected, there was marked improvement in the symptoms, and in many cases a decided increase in body-weight.

Ipecac.—Paul and Cownley⁷ have isolated 3 alkaloids from Brazilian ipecac—emetin, cephaelin, and psychotin. The last is present in very small quantities, and differs from the other alkaloids in being sparingly soluble in ether. It is readily soluble in alcohol and chloroform. Both emetin and cephaelin possess powerful emetic action, the emetic dose of emetin being double that of cephaelin. On the other hand, the nausea produced by cephaelin is said to be double that occasioned by emetin. Cephaelin may be used as an emetic in doses of from $\frac{1}{10}$ to $\frac{1}{5}$ of a grain. Emetin is better employed as an expectorant.

Iron.—Müller⁸ concludes from a series of experiments upon young pups that inorganic iron salts act by stimulating the activity of the blood-making organs. In support of this conclusion he found that iron caused a marked increase in the number of nucleated red blood-cells, and an increase in the number of mitoses. He believes that nothing is gained by using complicated preparations of organic iron. On the other hand, caustic preparations, like the tincture of the chlorid, should be avoided because their action on the gastric mucous membrane interferes materially with absorption. He states a preference for the oxytartrate

¹ Münch. med. Woch., Aug. 21, 1900.

² Svenska Tokare-sällskapet Fordhandligar, 1900.

³ Jour. Am. Med. Assoc., Nov. 17, 1900.

⁴ La Semaine Méd., Dec. 5, 1900.

⁵ Beitr. z. klin. Chir., Bd. XXVII, H. 1.

⁶ Jour. of Tuberculosis, Jan., 1901.

⁷ Am. Jour. of Pharm., vol. LXXIII, 1901.

⁸ Dent. med. Woch., Dec. 20, 1900.

of iron and for Blaud's pills. Cloetta¹ states that although iron is principally absorbed in the duodenum, it is a mistake to assume that it is absorbed only in this portion of the gastrointestinal tract. The author discovered that the iron-nuclein, a very resistant organic preparation of iron, was also absorbed further on in the intestinal tract, at least in the upper portion. Although the iron leaves the stomach fit for easy absorption, chemic influences soon change it so as to render it less assimilable. The author believes the bile and pancreatic and intestinal secretions cause this change. Henrotay² recommends hypodermoclysis in cases of amenorrhea in the young due to anemia. He introduces from 8 to 10 ounces of a solution of the pyrophosphate of iron (15 grains to the pint) beneath the breast. If the injection is too painful the glycerophosphate may be substituted. In 2 cases the menses returned after 8 injections. It was noted that a feeling of prostration was felt after the injection, which persisted until the following day.

Iron Cacodylate.—Gilbert and Lereboullet³ have used iron cacodylate in chlorosis and chloroanemias, especially **tuberculous chloroanemia**, with good results. Used hypodermically in the strength of a half-grain in each cubic centimeter of water, of which 2 cc. or 3 cc. was used at each injection, the drug was well tolerated locally and produced no untoward symptoms. By the stomach the dose ranged from 2 to 4 grains daily, although when administered in this way it proved less active than when given hypodermically. Sandoz⁴ concludes that hypodermic injections of iron cacodylate, in doses of from $\frac{1}{2}$ to $1\frac{1}{2}$ grains, in **pulmonary tuberculosis**, cause rapid improvement in the appetite, an increase in body-weight, a lowering of temperature, disappearance of night-sweats, and an amelioration of the general condition.

Jaborandi.—Jowett⁵ states that the leaves of jaborandi at present on the market are not from the true jaborandi, but from *Pilocarpus pennatifolius* and *Pilocarpus microphyllus*. The leaves vary considerably in the amount of pilocarpin they contain—rarely more than 0.5%, and sometimes none at all. Therefore, a salt of the alkaloid, preferably the nitrate on account of its stability, should replace the galenical preparations. Jowett has been unable to find an alkaloid answering to the description of jaborin in the leaves of commerce. Marshall⁶ found that injections of from 5 cc. to 10 cc. of a 1:5000 pilocarpin solution caused salivation, lessening of the heart-beats, and a fall of blood-pressure. After a short but variable interval, both rate and pressure gradually returned to the normal—the pressure sometimes slightly beyond normal. After larger doses the heart ceased to beat for a time, and then gradually returned to the normal. After still larger doses the heart was permanently stopped and the respiration was paralyzed. Simon⁷ maintains that his view that sweating with pilocarpin decreases the acidity of the stomach-contents has been con-

¹ Arch. f. exper. Path. u. Pharm., XLIV, H. 5 u. 6, 1900.

² La Gynécologie, Feb. 15, 1900.

³ Le Mois Therap., Sept. 30, 1900.

⁴ Thèse de Paris, 1900.

⁵ Brit. Med. Jour., Oct. 13, 1900.

⁶ Brit. Med. Jour., Oct. 13, 1900.

⁷ Zeit. f. klin. Med., 1900, Bd. XLI, H. 5 u. 6.

firmed by Ischurilow and also by Pawlow. Popelski¹ concludes that pilocarpin exerts a stimulating effect on the salivary and other superficial glands, but that its action on the deep-seated glands, such as those of the stomach and pancreas, is either altogether absent or very inconstant. Heermann² states that injections of pilocarpin often banish the vertigo and improve the hearing in Ménière's disease. In apoplectic deafness it has worked wonders in his experience. The patient must stay in bed while sweating. The treatment is contraindicated in corpulent and elderly persons.

Jambul.—Van Noorden,³ in a study of 600 cases of diabetes, states that jambul, used as the extract in dram doses in water before luncheon and on retiring, is a good general drug in diabetes. While it has no very marked action on the elimination of sugar, in combination with diet and other hygienic procedures it is of service.

Lead.—Wrangham⁴ reports 5 cases of lead-poisoning occurring in women who had taken diachylon pills for the purpose of inducing abortion. The author states that this use of lead is widespread in England. The symptoms afflicted the nervous system, eyes, and digestive tract. Four of the patients had optic neuritis and ocular paralysis. According to the author, optic neuritis is to be regarded with apprehension, since it usually presages delirium, convulsions, and probably death.

Lecithin.—Huehard⁵ reports a case of diabetes in which marked improvement followed the use of lecithin in 4-grain doses 5 times a day, and another case of gastric ulcer with severe anemia in which recovery occurred under lecithin (4 grains) administered hypodermically daily for 15 days.

Lysoform.—This is a combination of lysol and formaldehyd, of a thin soapy consistence, and soluble in water and alcohol. Simons⁶ recommends it as an injection in affections of the genitourinary organs. As a vaginal injection he uses a 1% to 2% solution; in cystitis he injects into the bladder 2½ to 8 drams of a 2% solution. In chronic gonorrhea he recommends injections of a 1% solution. The effect, according to the author, has been remarkably good. Strassmann⁷ claims that lysoform in 5% solution is as active an antiseptic as 3% solution of lysol or 1:1000 mercuric chlorid. The advantage claimed for lysol and lysoform is that both are naturally lubricant in their properties, and both leave the mucous membrane or the skin in a smooth or slippery condition. The author especially recommends lysoform as an antiseptic for the hands. Ahlfeld,⁸ after experimenting with 3% and 4% solutions of lysoform for disinfecting the hands, concludes that that method is no better than others usually employed.

Lysol.—Hartigan⁹ reports a fatal case of poisoning in a boy, aged 14 years, from the injection of less than 1½ ounces of lysol in a pint of water into the bowel for dysentery. The symptoms were unconscious-

¹ Vrach, Apr. 14, 1901.

² Deut. med. Woch., Sept. 26, 1901.

³ Dent. Praxis, 1901, No. 1, S. 1.

⁴ Brit. Med. Jour., 1901, No. 2115.

⁵ Jour. des Praticiens, July 13, 1901.

⁶ Allg. med. Centralzeitung, 1900, No. 66.

⁷ Centrbl. f. Gynäk., 1901, No. 11.

⁸ Centrbl. f. Gynäk., 1901, No. 51.

⁹ Brit. Med. Jour., Nov. 24, 1900.

ness, contracted pupils, rapid breathing, subnormal temperature, hematemesis, and collapse.

Magnesium Sulphate.—Cruikshank¹ believes that this drug is as nearly a specific for dysentery as quinin is in malaria. It should be given in dram doses every 2 hours, dissolved in a very little water and mixed with a little aromatic sulphuric acid. This treatment should be continued until the stools acquire a normal appearance.

Mercuriol.—This is a compound of yeast nuclein and metallic mercury, containing about 10% of mercury. Ayres,² after a thorough and extensive test of mercuriol in the treatment of syphilis, finds (1) that it causes less disturbance of the gastrointestinal tract than any other preparation of mercury used internally; (2) it controls the skin manifestations and the pains much better than any other preparation, while on the mucous membrane eruptions it has as good an effect as any other, and has equally as good an effect upon the chancre. The author advises $\frac{1}{2}$ to 1 grain as a beginning dose. Salivation has been produced by 2 grains, while in other cases as much as 6 grains have been taken without any disagreeable effects. Guiteras³ reports the results of treating 150 cases of gonorrhea with mercuriol. The average strength best borne by patients was 2%. Complications resulted in only 2 cases—1 of gonorrheal rheumatism, and 1 of epididymitis. Posterior urethritis resulted in but 1 instance. The author believes that the drug is a useful germicide.

Mercury.—Sigalas and Dupuy⁴ have shown from experiments on a number of syphilitic women, who were on specific treatment, and on a healthy woman and a goat that mercury is eliminated in the milk. They conclude that the method of treating a syphilitic child by administering mercury to the mother is a perfectly rational one. Leyden⁵ states that it is unfortunate that the diuretic properties of calomel are not taken more into consideration. In cases in which other diuretics fail, calomel should be used 3 to 5 times daily. The diuretic effect generally appears with the beginning mercurialism, and in the case reported by Leyden showed itself on the sixth day. Fournier⁶ considers calomel injections the best means of obtaining a powerful action on syphilis. He recommends this method only in exceptional cases when the condition is severe. The needle should be introduced deeply into the gluteal muscles, and a short interval allowed to elapse before the calomel is injected in order to see if any blood comes. No injection should be made when blood comes. The calomel should be sublimed, as the precipitated is apt to form lumps. It should be washed carefully in boiling alcohol and then dried. The best vehicle is sterilized olive oil. The average initial dose is $\frac{3}{4}$ of a grain, and if this is well borne it may be increased to $1\frac{1}{2}$ grains. The injections are made weekly, or every 10 days, and 4 to 6 are usually sufficient. The chief complications are stomatitis, gastroenteritis, toxic effects, local reaction,

¹ Jour. Am. Med. Assoc., Jan. 5, 1901.

³ Lancet, Sept. 22, 1900.

⁵ Fortschritt d. Med., 1901, No. 12.

² Phila. Med. Jour., 1900, No. 19.

⁴ Merck's Arch., Nov., 1900.

⁶ Rev. de Therap., Nov. 1, 1900.

and pain. Abscess is rare, and with doses of $\frac{3}{4}$ of a grain the author has seldom seen more than slight stomatitis, gastroenteritis, or intoxication. Stern¹ prefers the injection treatment of syphilis on account of its greater certainty, rapidity, and cleanliness. He prefers the following combination: Corrosive sublimate, 1 milligram (2 milligrams in the case of men); distilled water, 100 milligrams; boil, and add sodium chlorid, 3 milligrams; boil and filter. Twenty-five to 30 injections usually suffice to effect a cure. Lusignoli² reports 3 cases of purpura hæmorrhagica in persons who recovered under several injections (1 to 4 milligrams each) of corrosive sublimate. In another case he was apparently not so successful. The author also reports the cure of a case of peliosis rheumatica and a case of scorbutus by the same plan of treatment. La Page³ reports a case of fatal poisoning from the injection, by mistake, of a strong solution of corrosive sublimate into the womb of a woman who had had an abortion. Notwithstanding the fact that the womb was at once washed out with sterile water and packed with gauze, the patient speedily developed anuria, mercurial diarrhea, and delirium, and died.

Mercury Ethylenediamin Citrate.—Kroenig and Blumberg⁴ conclude that this salt of mercury, when used in 3 : 1000 solution, gives the same result in hand-disinfection as a 1 : 1000 solution of corrosive sublimate, with this advantage, however, that the former has no irritating effect upon the skin, and that, moreover, the new compound has a far more penetrating action, owing to the fact that the ethylenediamin prevents the coagulation of albumin.

Mercury Oxycyanid.—Deguy⁵ recommends mercury oxycyanid as a substitute for corrosive sublimate for general antiseptic purposes in solutions of the same strength as the latter salt. The product employed by him is a yellowish-white, inodorous, crystalline powder of a neutral reaction, and should never be acid. This is readily soluble in cold water, differing in this respect from other salts which vary according to the mode of preparation, and to the proportions of the mixture of the oxid and cyanid, and also to the purity of the salts. The advantages claimed for this oxycyanid are that it does not alter instruments placed in its solutions, it can be made into compressed tablets, and is not so irritant to the hands or other tissues, while its antiseptic properties are equal to sublimate solutions of the same strength.

Methylene-blue.—Iwanoff⁶ reports his investigations on the effects of this drug on the various forms of malarial parasites. He gave methylene-blue in doses of 5 grains each, 3 daily, to patients in whose blood there were tertian parasites. He found that destruction of the crescents continued until nothing was left but the pigment. Comparing the effect with that of quinin, he says that methylene-blue affects the protoplasm, and the latter the pigment (chromatin). In the early

¹ Münch. med. Woch., July 2, 1901.

² Arch. Gén. de Méd., Jan., 1901.

³ Compt. Rend. de la Soc. d'Obstét., de Gynécol., et de Ped. de Paris, 1901, vol. III.

⁴ Münch. med. Woch., No. 29, 30, u. 45, 1900.

⁵ Jour. des Praticiens, Nov. 3, 1900.

⁶ Deut. med. Woch., May 2, 1901.

forms the proportion of pigment to protoplasm is quite different from that in the adult stages, and so the early forms are scarcely affected by methylene-blue, though they are very markedly affected by quinin. Manson¹ states that methylene-blue, in 3- or 4-grain doses, appears to have some virtue in malaria, and may be of service when, owing to an idiosyncrasy, quinin cannot be taken. Chaleix-Vivie and Kohler,² as the result of a series of clinical experiments with methylene-blue, pure, in concentrated solution, and in the form of powder, affirm that it is a valuable remedy in cases of uterine hemorrhage and leukorrhea, and has a marked analgesic action in dysmenorrhea associated with disease of the endometrium. It is also useful in disease of the adnexa. Dennis,³ in discussing the treatment of malignant disease, writes concerning methylene-blue that he has rarely seen benefit from it, and never a cure. He has observed a decrease of odor and some retardation in ulceration under its administration, but on the whole it has failed to accomplish that which was expected of it. Lewis⁴ has found that methylene-blue, injected into the pleural sac in cases of pleural effusion, prevents reaccumulation of the fluid and promotes adhesion of the pleural walls. From 5 to 15 grains is mixed with serum which has been withdrawn by a specially devised aspirating syringe and which is immediately returned. The drug appears in the urine in from $\frac{1}{2}$ hour to 4 hours. The average duration of treatment for 23 serofibrinous cases was less than 14 days. Aposti⁵ has given methylene-blue in pill form in several cases of hysteria. Scarcely did the blue begin to show in the urine than the symptoms ceased. The effect is chiefly due to suggestion, but there is also some sedative power in the drug. Marimo has obtained identical results, and attributes the good effects partly to the antiseptic action of the remedy in the digestive canal, believing that autointoxication is often responsible for the hysteric attack. Berthier⁶ recommends enemas of methylene-blue in the treatment of dysentery. An enema of from 0.5 to 1 liter of warm water, containing 1 to 2 decigrams of the drug in solution, should be slowly administered four times a day, and retained as long as possible. The symptoms rapidly abate, and bile appears in the stools. Only a small quantity of the drug is absorbed from the rectum. In addition to its analgesic action methylene-blue acts as an antiparasitic and cholagog, and exerts its influence without causing irritation or toxic effects.

Methyl-violet.—Barbera⁷ concludes from observations made on dogs with permanent biliary fistula that this drug is eliminated in part in bile, but that it does not increase the quantity of the bile or its solids.

Morphin.—Riegel⁸ has demonstrated by experiments on animals and man that morphin in therapeutic doses increases the secretion of

¹ Practitioner, Mar., 1901.

² La Gynécologie, 1900, No. 5.

³ Jour. Am. Med. Assoc., Oct. 19, 1901.

⁴ Med. News, June 1, 1901.

⁵ Riv. Crit. di Clin. Med., Nov. 24, 1900.

⁶ L'Echo Méd. du Nord, Oct. 14, 1900.

⁷ La Riforma Med., 1900, No. 85.

⁸ Therap. der Gegenwart, 1900, No. 8.

gastric juice. He concludes that it is contraindicated in gastric affections with increased secretion of acid, such as peptic ulcer. Hirsch¹ and Lépine² arrive at similar conclusions. Lauszk³ believes that morphin should be given cautiously to old people, especially those with arteriosclerosis, since they have a special intolerance for the drug.

Myrtol.—Cohen⁴ has obtained excellent results from this derivative of myrtle oil as a stimulant expectorant, especially in bronchorrhea, bronchiectasis, asthma, and fibroid tuberculosis. The dose is from 5 to 15 minims on sugar or in capsules.

Nitric Acid.—Popper⁵ has found nitric acid in the strength of 1 : 300 or 1 : 400 of water far superior to silver nitrate in gonorrhea. The injections are said to be painless and are repeated 4 or 5 times daily.

Olive Oil.—Witthauer⁶ has employed olive oil in biliary colic with excellent results. He gives it by the mouth in 1-ounce doses with peppermint oil. When the patients can no longer take it by the mouth he employs it in the form of an enema, about 400 to 500 cc. being injected at first every day, and later at longer intervals. He reports 3 cases in which large numbers of stones were successfully discharged by this method. Cohnheim⁷ concludes that cases of gastrectasis, depending upon spasm of the pylorus from ulcer or fissure, are cured or markedly improved in a short time by the introduction of large doses of olive oil. The oil causes relaxation of spasm, diminishes friction, and improves nutrition, since even in pronounced stenosis it reaches the bowel and is absorbed. The oil is best administered through a tube, thrice a day, in doses of 50 cc., an hour before meals.

Orexin.—Bodenstein⁸ has had great success with this drug, in doses of from 5 to 8 grains, 2 to 4 times daily, in anorexia from various causes, especially in neurasthenic and hysteric subjects. Smithwick⁹ believes that orexin is the best remedy for anorexia in children.

Orthoform.—Dubrenile¹⁰ describes the following varieties of eruption from the use of orthoform: erythema, alone or combined with vesicles, and a rare type of gangrenous eruption. The former is transitory and may arise from dusting the drug powder on healthy skin; the second type has been observed in connection with varicose ulcers. Graul¹¹ reports a case of diffuse toxic dermatitis resulting from the application of a 10% orthoform ointment to a broken blister.

Ovarian Extract.—Jack¹² holds that ovarian extract is indicated in all cases of menopausal nervous symptoms, or when, for any reason, it is desirable to increase the flow from the uterus. Krusen¹³ has never seen any good results follow the use of ovarian extract except in a few instances of artificial menopause, in which the nervous symptoms were

¹ Centralbl. f. innere Med., 1901, No. 2, S. 72.

² La Semaine Méd., 1901, p. 58.

⁴ Merck's Arch., Nov., 1900.

⁶ Münch. med. Woch., Oct. 23, 1900.

⁸ Wien. med. Presse, XLI, No. 50.

¹⁰ La Presse Méd., 1901, No. 4.

¹² Internat. Jour. of Surg., Oct., 1900.

³ Vratsh, XXII, No. 8.

⁵ Klin.-therap. Woch., No. 39, 1900.

⁷ Brit. Med. Jour., Nov. 3, 1900.

⁹ Merck's Arch., 1900, No. 3.

¹¹ Dent. med. Woch., June 6, 1901.

¹³ Internat. Med. Mag., Nov., 1900.

apparently ameliorated; and in these cases he is inclined to believe that the effect was due to mental suggestion rather than to the physiologic action of the drug. Montgomery¹ also states that he has never seen the slightest influence through the use of ovarian extract.

Oxygen.—Steele² reports the case of a man, aged 50 years, with severe angina pectoris, who was much relieved by inhalations of oxygen. He remained free from attacks for 6 weeks. Österwald³ calls attention to the observations of von Lenbe and Rosenthal that artificial respiration is remarkably beneficial in strychnin-poisoning. Following up the subject he has substituted oxygen inhalations for artificial respiration, and finds that guinea-pigs can take more than double the convulsive dose of the poison if breathing oxygen at the time. Aron,⁴ after extensive study of the action of oxygen inhalation as a therapeutic measure, announced his conviction that it is comparatively useless except in carbon dioxid or anilin intoxication, or in disturbances due to rarefaction of air.

Ozone.—Caratzalis⁵ reports the results obtained in 95 cases (including various forms of anemia and tuberculosis) from inhalations of ozone. Three séances daily of 5 minutes each were given in a room the air of which was charged with ozone. In every case the oxyhemoglobin increased during the treatment, in some instances even doubling its quantity compared with the low ratio it had at the beginning of the treatment.

Phosphorus.—Zweifel⁶ states that phosphorus in cod-liver oil soon becomes phosphoric acid, and that when phosphorated oil is given to children with rachitis it is the oil alone that acts and not the phosphorus. Monti⁷ states that clinically phosphorus has not prevented the progress of rachitis, nor has it caused the slightest improvement. He agrees with Zweifel that no specific action of unoxidized phosphorus has been proved either experimentally or clinically.

Phototherapy.—Teredde⁸ reports the results from phototherapy in 11 rebellious cases of lupus erythematosus of the face. Of these, 3 were cured, 2 were benefited to a marked degree and passed from under treatment. Of the 6 patients remaining 4 were being cured and 2 showed no improvement. The author regards this method of treatment the best for grave forms of the disease.

Picric Acid.—C. W. Allen⁹ states that he knows of no better local remedy for burns of the first and second degree than picric acid. Applied in a 1% watery solution it has the effect of giving almost immediate relief from pain, and healing takes place rapidly under its use. After the burned area has been coated once or twice with the solution a thin layer of absorbent cotton may be applied dry, over this a layer of impervious tissue, then as much cotton as is required, and over this a loose bandage. At subsequent dressings all may be removed excepting

¹ *Ibid.*

² *Arch. f. exper. Path. u. Pharm.*, 1901, Bd. XLIV, S. 451.

³ *Berlin. klin. Woch.*, Sept. 16, 1901.

⁴ *Wien. klin. Woch.*, Jan. 10, 1901.

⁵ *Bull. Gén. de Thérap.*, Jan. 23, 1901.

⁶ *Brit. Med. Jour.*, Dec. 1, 1901.

⁷ *Thèse de Paris*, 1900.

⁸ *Wien. klin. Med.*, Jan. 17, 1901.

⁹ *Pediatrics*, Mar. 15, 1901.

the dressing next to the skin, which may be made with the picric acid solution and the dressings be applied as before. De Brun¹ has obtained excellent results in anterior urethritis from injections of picric solutions of 1 : 100 or 1 : 200, three times a day. According to the author, the treatment is of no value in posterior urethritis. Romero² reports that of 162 cases of smallpox 46 were cured without noticeable scars and 101 without a single trace of pitting when treated with picric acid as a lotion. The formula was picric acid 2 grams, alcohol 15 grams, water 185 grams. This was applied thrice daily. When the eruption was already suppurating he employed, 4 times a day, the following ointment : 1 to 1.5 grams of picric acid, 6 grams of alcohol, and 100 grams of liquid vaselin.

Pilocarpin.—(See Jaborandi.)

Pituitary Body.—Kuh⁴ states that in 2 cases of akromegaly headache was relieved and decided nutritional improvement resulted from the use of powdered pituitary bodies. Osborne⁵ also used pituitary treatment in 1 case with remarkable improvement, and in 1 case with negative results.

Potassium Bicarbonate.—Harnsberger³ states that 30 grains of potassium bicarbonate every 4 hours will often effectually abort colds, and will do more good in influenza than any other remedy.

Potassium Iodid.—Montgomery⁶ contends that small doses of iodids do not induce iodism more rapidly than larger ones, and that if the iodid is commenced in small doses, 7 to 8 grains, iodism rarely occurs. Nothing absolutely prevents iodism when the tendency exists. Belladonna (5 minims of the tincture) relieves the coryza. Fowler's solution (1 drop to 15 grains of iodid) is useful in preventing indigestion. Salol and sodium chlorate, when given with iodid, permit of larger doses without the causation of iodism. Schroeder⁷ demonstrates that it is impossible to administer potassium iodid with any exactness of dosage when dispensed in the form of a saturated solution. One minim of a saturated solution does not contain 1 grain of the salt, but less ; 1 drop is not equal to a minim of the solution ; a minim of a saturated solution contains 0.88 grain ; a drop contains, according to the dropping medium (bottle, glass tube, pipet), from 0.91 grain (glass tube) to 0.43 grain (bottle).

Potassium Permanganate.—Belomsoff⁸ has tried applications of potassium permanganate in the treatment of lupus, as recommended a year or two ago by Katschenovsky. The results were very encouraging. Several applications of the remedy, preceded by a 10% cocaine solution, sufficed to destroy the diseased tissue, leaving a clean ulcer, which healed under a dressing of iodoform gauze. Bulkley⁹ states that potassium permanganate in 2% or 3% aqueous solution, painted over the parts and allowed to dry, is an excellent antipruritic in eczema.

¹ Jour. des Praticiens, June 15, 1901.

³ Phila. Med. Jour., Nov. 10, 1900.

⁵ *Ibid.*

⁷ Phila. Med. Jour., Nov. 24, 1900.

² Cronica Med. Mexicana, Aug. 1, 1901.

⁴ Phila. Med. Jour., June 22, 1901.

⁶ Med. Age, vol. XVIII, 1900.

⁸ Rev. de Thérap., LXVII, No. 24.

⁹ Merck's Arch., June, 1901.

Protargol.—Reichmann¹ gives a review of the literature upon the use of protargol in **gonorrhea**, and cites 16 cases in private practice which demonstrate the value of the drug. Treatment in each case was begun with a 0.5% watery solution, which was injected 4 times daily for 3 days. The fluid was retained in the urethra for 5 minutes at the morning, noon, and afternoon injections, while in the evenings 2 successive injections were to be taken, and each retained 10 minutes. At the end of 3 days a 1% solution was ordered, to be used once a day, providing the microscope revealed no gonococci. In 15 cases the gonococci disappeared entirely in from 3 to 9 days; nevertheless, 1 daily injection of a 1% solution was continued for 2 weeks. In 1 case the author was compelled to stop the treatment on account of the occurrence of complications; but even in this case protargol finally gave satisfactory results, though the treatment had to be continued for a longer time. Niessen² concludes from an experience with protargol in **244 cases of gonorrhea** that gonococci disappear from the secretion in anterior urethritis in about the same length of time (3 weeks) as when treated with silver nitrate; in 0.5% to 0.75% solution the salt causes very little discomfort; complications are less liable to occur than under silver nitrate; when gonococci have disappeared, astringents are better than protargol; protargol does not shorten the course of the disease more than the best of earlier methods. Balch³ believes that protargol makes a safe injection for the patient to use himself. A 0.5% solution is as strong as is safe to begin with, and if there is much scalding this should be diluted. Burrage⁴ states that protargol in solutions of from 1% to 5% has given better results in the gonorrhea of women than the many other salts of silver. Swinburne⁵ uses in gonorrhea for the first few days, twice daily, irrigations of a 1:4000 solution of potassium permanganate at a temperature of 105° to 120° F., and subsequently 0.5% to 2% solutions of protargol. Van der Poel⁶ recommends for anterior urethritis 0.5% to 1.5% solutions of protargol, and for posterior urethritis a strength of 0.5% to 1%. Taylor⁷ prefers silver nitrate to protargol. Piotrowski⁸ recommends protargol (10% solution) as the best preventive of ophthalmia neonatorum. After cleansing the lids with a 3% solution of boric acid the solution of protargol should be dropped into the conjunctival sac. In 1030 cases thus treated there was not one instance of blennorrhea, and only 1.2% of cases of secondary catarrh. Ewart⁹ has obtained most satisfactory results in tuberculosis from intravenous injections of protargol. The injections consist of 40 cc. of saline solution containing from 1.5 to 2.5 grains of protargol, and this is preceded and followed by an injection (through the same needle) of a few cubic centimeters of pure saline solution to obviate leakage of irritating fluid into the tissues. From 12 to 15 injections, one every other day, usually suffice.

¹ Medicine, May, 1901.

² Münch. med. Woch., Mar. 19, 1901.

³ Boston M. and S. Jour., Feb. 7, 1901.

⁴ *Ibid.*

⁵ Jour. Am. Med. Assoc., Apr. 6, 1901.

⁶ *Ibid.*

⁷ *Ibid.*

⁸ Centralbl. f. Gynäk., Aug., 1901.

⁹ Phila. Med. Jour., Aug. 31, 1901.

Quinic Acid.—Sternfeld¹ highly recommends this substance, obtained from various fruits, in the treatment of the uric-acid diathesis. It is converted into benzoic acid, and finally into hippuric acid, in the body, and when combined with uric acid promotes the elimination of the latter. The great objection to it, at present, is its high price. Moir² has found **urosin** (a combination of quinic acid and lithium), in doses of 7.5 grains, from 6 to 10 times daily, an excellent palliative remedy in 5 cases of arthritis. Salfeld³ states that **sidonal** (a combination of quinic acid and piperazin) is a good remedy in both acute and chronic gout. He recommends the powdered drug in doses of 15 grains, 5 or 6 times daily.

Quinin.—Jaboulay⁴ has found subarachnoid injections of quinin superior to cocain in inducing analgesia. The latter under quinin is less in extent, but it lasts for 2 weeks. The author uses the drug in concentrated solution, 0.5 eg. to the cubic centimeter. He has found 5 eg. or even 2.5 eg. sufficient. The treatment, according to the author, is an effective measure for relief, and possibly cure, of painful cystitis, cancers of the rectum, sciatica, neuritis of the leg, pelvic neuralgia, and inveterate onanism. Huehard⁵ claims to have seen extraordinary relief in aortic insufficiency, with marked pulsation of the cervical arteries and severe palpitation, follow the use of quinin hydrobromate in daily doses of 15 grains. Bluenchen⁶ calls attention to the fact that quinin muriate dissolves readily in boiling water in the proportion of 1 grain to 1 cc., and that it does not crystallize out on cooling. He states that when this solution is injected beneath the skin, and not merely into the skin, it causes no pain, induration, or other unpleasant results. Dolehe⁷ states that quinin has an important field of usefulness in the treatment of **uterine affections**. He recommends it in congestive dysmenorrhea, amenorrhea, and in menorrhagia and metrorrhagia not dependent upon organic disease. Fussell⁸ thinks quinin is not so frequently used as it should be in labor. He has never found it to fail when the labor pains were slow and inefficient from simple uterine inertia. Given in 15-grain doses the drug causes an increase of force and frequency of uterine contractions exactly resembling normal labor pains. Cinchonism did not occur in these cases and the employment of the drug frequently obviated the use of forceps. Kerley⁹ concludes, from a study of 752 cases of **pertussis**, that quinin in large doses (12 to 20 grains daily) is of great benefit, diminishing the severity and number of the paroxysms, but not so useful as antipyrin or a combination of antipyrin and bromids. Watkins¹⁰ advocates the vigorous and persistent use of quinin in **malarial hematuria**. Parrott¹¹ employs quinin in **malarial hemoglobinuria** when the parasites are present in the blood. Sambon¹² believes that quinin does not cause hemoglobinuria in malarial patients, and that

¹ Münch. med. Woch., Feb. 12, 1901.

² Münch. med. Woch., XLVIII, No. 16.

³ Jour. des Praticiens, Dec. 1, 1900.

⁴ La Presse Méd., Jan. 8, 1901.

⁵ Pediatrics, May 1, 1901.

⁶ *Ibid.*

⁷ Therapist, Apr. 15, 1901.

⁸ Bull. Méd., Aug. 17, 1901.

⁹ Deut. med. Woch., Apr. 25, 1901.

¹⁰ Therap. Gaz., Jan. 15, 1901.

¹¹ Therap. Gaz., May, 1901.

¹² Practitioner, Mar., 1901.

occurrence of the symptom after the administration of the drug is merely a coincidence. On the other hand, Stephens¹ insists most positively that quinin is harmful in so-called blackwater fever. Sparkman² never uses the drug until from 20 to 30 hours have elapsed after the hemorrhage. Hare³ reports the case of a man, aged 53 years, who, 12 hours after taking 2 grains of quinin, developed extensive **erythematous rashes** with puffiness of the skin and itching. Desquamation followed in 5 days and was not completed within 6 weeks. The daughter of the patient had a similar **idiosyncrasy** to quinin. Bock⁴ reports that a patient, after receiving 3 1-grain pills of quinin, developed marked roaring in the ears, deafness, intense headache, generalized pains, extensive facial erythema, and collapse. At the end of 4 weeks the patient's hearing was still reduced one-half.

Rhus Aromatica.—Perlis⁵ concludes, from a study of 156 reported cases, that the fluid extract of *Rhus aromatica*, in doses of from 50 to 60 drops daily, is equal, if not superior, to all other remedies in the urinary incontinence of children.

Rhus Glabra.—Cassidy⁶ reports 3 cases of enuresis in children in which a permanent cure was produced with the fluid extract of *Rhus glabra*, 20 minims at bedtime.

Salol.—Teschemacher⁷ reports upon the use of salol in 9 cases of diabetes. Six of the cases were benefited; in the others the action of the drug was negative. The dose was 15 grains, 3 to 4 times a day, for 5 or 6 days.

Salophen.—Audebert⁸ highly recommends this drug in doses of 15 grains, repeated in 2 hours when necessary, for the treatment of after-pains. He states that it relieves the pains promptly without interfering with the contractions of the uterus.

Santonin.—Negro⁹ has found that santonin in 3 doses of 5 grains, at 3-hour intervals, in 11 patients with locomotor ataxia, gave relief in 8, temporarily relieved 2, and did not affect 1. The routine of giving 10 grains as an initial dose, and 5 grains 5 hours later, was adopted.

Scopolia.—Wilcox¹⁰ concludes, from a comparative study of the physiologic action of the official liniments made of belladonna fluid extract and liniments made of scopolia fluid extract and camphor, that scopolia rhizome incorporated in a liniment is devoid of therapeutic action and should not be substituted for belladonna root. H. C. Wood, Jr.,¹¹ after a comparative study of these drugs, concludes that *Scopolia carniolica* in its physiologic action so closely resembles *Atropa belladonna* as to be practically indistinguishable. Like belladonna, scopolia raises the blood-pressure, paralyzes the pneumogastric nerve, is primarily a stimulant of the respiratory center, and, in a

¹ Lancet, Mar. 23, 1901.

³ Therap. Gaz., May, 1901.

⁵ Le Mois Thérap., Sept. 30, 1900.

⁷ Therap. Monatshefte, 1901, H. 1, S. 23.

⁸ Arch. Méd. de Toulouse, Feb. 1, 1901.

⁹ Giornale d. Reale Acad. di Med. di Torino, 1901, vol. XVII.

¹⁰ Med. News, Mar. 2, 1901.

² Therap. Gaz., May 15, 1901.

⁴ Merck's Arch., No. 8, 1900.

⁶ Merck's Arch., Apr., 1901.

¹¹ Therap. Gaz., Apr. 15, 1901.

fatal dose, kills by asphyxia. In the frog it is a paralyzant to the spinal cord and to Setchenow's center, and when brought in direct contact with a motor nerve, lessens its function. The dominant alkaloids of the two plants, however, are probably not identical, since we find the scopolia apparently a little more depressant to the spinal cord, and distinctly more toxic. A later paper by Wilcox¹ concludes as follows: "The results obtained show that, while the camphor did not interfere with the results so far as the scopolia rhizome fluid extract was concerned, it certainly aided in the absorption of the active principles of belladonna root. This second series of experiments gives practically the same results as the first, and the conclusion so far as concerns scopolia still obtains. Knowing that the effects of liniments and other external applications are considerably greater if vigorous friction or rubbing is employed, in all these observations this was insisted upon. 'The ratio of absorption with the use of an oclusive dressing,' as Hallberg, in noticing my former paper, very properly suggests, 'would be interesting,' and, to determine this, experiments have been undertaken and carried out for several months. These will be reported at a later date and their results will, I trust, be of considerable importance in solving the debatable questions in regard to the efficacy of plasters. So far as this method of application—thorough inunction—is concerned, scopolia rhizome cannot be substituted for belladonna root."

Scopolamin Hydrobromate.—Rosenfeld² finds that this drug, in average doses of from $\frac{1}{200}$ to $\frac{1}{100}$ grain, thrice daily, acts as a strong sedative in the insane and also in those with minor nervous disorders. Dryness of the skin, itching, and vertigo were occasionally observed after its use. It is essential to use fresh solutions for injection, as decomposition of the drug takes place in old preparations.

Silver.—Credé³ claims that soluble colloidal silver is absolutely unirritating and is extremely bactericidal even to very virulent staphylococci. He reports that 3 years of experience have confirmed his previous assertions in regard to its efficacy and harmlessness as an external application. He recommends it now as a means of general internal disinfection in all streptococcus and staphylococcus infections not too far advanced. It has no action in subcutaneous injections and very little by the mouth. It must be used in inunctions or by intravenous injections. He uses 15% ointment of colloidal silver, rubbing 2 or 3 grams into the skin after preliminary scrubbing and friction to induce hyperemia. When the skin is unable to absorb the remedy from any cause, intravenous injections are substituted, from 5 to 20 cc. of a 0.5% to 1% solution being administered, and repeated in from 1 to 8 days as required. Experiments on animals showed that the silver finally settled in the spleen, kidneys, and intestinal walls, and that after a few weeks no trace of silver was discoverable in the organism. Viêt,⁴ from his experience in 20 cases of sepsis, concludes that colloidal silver

¹ Med. News, Aug. 3, 1901.

² Therap. der Gegenwart, 1901, Bd. VII, S. 298.

³ Berlin. klin. Woch., Sept. 16, 1901.

⁴ Allg. med. Central-Zeitung, 1901, No. 19 u. 20, S. 61 u. 73.

is a most effective agent **against various pyogenic organisms**. He employs large doses, using 45 grains in one injection. Lange ¹ injected into the jugular vein of a rabbit colloidal silver to the amount of 6.2 grains of metallic silver. After 9 days the animal was killed. The only change demonstrable was a moderate grayish discoloration of certain tissues. Chemie analysis revealed the presence of silver as chlorid in the spleen, intestine, kidneys, heart, and lungs. Gindes and Balardzsheff ² found that collargol, even in strong solutions (1 : 100), had little or no effect on anthrax, staphylococcus, or streptococcus. Injections of collargol followed within from 1 to 2 hours by inoculations, *in the same place*, of anthrax saved the life of the animals, but when the inoculations were made at a point *distant* from the place of injection, the animal succumbed. Injections into the blood-current not only failed to save the animals from a fatal issue, but produced death in animals not infected. The results from clinical tests were in accord with the laboratory experiments. No beneficial effects whatever were observed. The authors agree with Baginsky, Naltenius, and Kunze-Krause that the argentum colloidal Credé is without systemic effect.

Sodium Cacodylate.—Manchetti ³ states that cacodylic acid contains about 53% of arsenic, and, since it is essentially an organic compound, it possesses chemie and physiologic properties different from the mineral preparations of arsenic. He recalls the fact that metallic arsenic not modified by the white corpuseles, but brought directly in contact with the nervous centers, is 100 times more poisonous than that transported in the blood to the nerve centers after having been assimilated or organized by the leukocytes. He states that both cacodylic acid and sodium cacodylate may become poisonous when administered by the mouth if they meet with reducing agents in the alimentary canal. He prefers the subcutaneous method of administration. The dose varies from 1 to 1½ grains of sodium cacodylate hypodermically up to 6 grains daily by mouth or rectum. Bormano ⁴ states that sodium cacodylate increases the number of red blood-corpuseles, and can be employed in anemia when iron is not well borne, and that in all instances in which arsenic is indicated this remedy can be given in much larger doses than it is believed can be useful to the organism. Lannois ⁵ has used sodium cacodylate in the treatment of 3 cases of **chorea**. He administered the drug hypodermically, first in doses of ¼ grain, then in doses of ⅔ grain. All three patients recovered in from 1 to 3 weeks. Langenhagen, ⁶ Ewart, ⁷ Rocay, ⁸ and Gautier ⁹ have found the drug very useful in **pulmonary tuberculosis**. Davezoc ¹⁰ has employed it successfully in a very persistent case of **pemphigus**. Payne ¹¹ reports 2 cases of **cancer** (one inoperable) in which hypodermic injections of

¹ Therap. Monatshefte, 1900, No. 8, S. 423.

² Russkí Arch. Patologii, klin. Med., i Bakt., June, 1901.

³ Rivist. Crit. di Clin. Med., No. 14, 1900.

⁴ Gaz. degli Osped., No. 39, 1900.

⁵ Hospitalstidende, vol. VIII, 1901.

⁶ La Semaine Méd., 1900.

⁷ Jour. de Méd. de Bordeaux, 1900.

⁸ Rev. de Thérap. Méd.-Chir., LXVIII, No. 5.

⁹ Polyclinic, Oct., 1900.

¹⁰ Jour. des Praticiens, July 13, 1901.

¹¹ Lancet, May 25, 1901.

sodium cacodylate were followed by a marked improvement, local and general. He believes that the drug is a valuable palliative remedy, and that it should at least be given a trial in inoperable cases. Murrell¹ reports a case of **poisoning** in a tuberculous patient from the administration of the drug by the mouth in doses of 1 grain, thrice daily. After 11 doses the patient was found to be suffering from the symptoms of poisoning, including neuritis. [The value of this remedy seems to be here established, but the hypodermatic method of administration is infeasible.]

Sodium Cinnamate.—Mann² has used intravenous injections of sodium cinnamate, $\frac{1}{100}$ grain, gradually increased to $\frac{1}{4}$ or $\frac{1}{3}$ of a grain, in pulmonary tuberculosis with encouraging results. Marked drowsiness was sometimes noticed after the injections, but no local disturbance was induced in over 800 injections. Hödlmoser³ reports 18 cases treated with cinnamic acid. Of this number 22% improved. The author is not sure that improvement was due entirely to the drug; he believes, however, with Ewald, that the treatment is worthy of further study. Guttman,⁴ from an experience with sodium cinnamate in 33 cases of tuberculosis, concludes that the remedy is distinctly valuable in mild cases. Krompecher⁵ found, in a series of experiments on animals, that sodium cinnamate caused temporary leukocytosis, hyperemia of bone-marrow, and an increase in the stroma of the lungs, owing, it is believed, to mechanical irritation. Preventive treatment by injections gave no immunity against infection by virulent bacilli; and suitable animals inoculated with virulent bacilli died from tuberculosis, in spite of the use of sodium cinnamate, as rapidly as animals used for comparison. Krokiewicz⁶ has treated 43 cases of tuberculosis with injections of sodium cinnamate. Twenty-five per cent. improved. He concludes that the treatment is of use only in the very beginning of the disease. Staub⁷ concludes, from an experience with sodium cinnamate in 20 cases of tuberculosis, that the remedy does not favorably influence the course of the disease in any way. Gidionsen,⁸ Fraenkel,⁹ Kühn,¹⁰ and Finkelstein¹¹ have observed no good effects from the remedy.

Sodium Persulphate and Metvanadate.—Garel¹² has found sodium persulphate very useful in overcoming the digestive disturbances of the first and second stages of tuberculosis. He administers 3 grains in $\frac{1}{2}$ pint of water every morning, about $1\frac{1}{2}$ hours before breakfast. Robin¹³ finds that sodium persulphate is an excellent aperient, it having given good results in half the cases in which it was employed. The author uses it in a solution of 30 grains of persulphate in 10 ounces of water, of which a tablespoonful is given twice a day before the chief meals. Good results have been obtained in cancer of the stomach, in

¹ Lancet, Dec. 29, 1900.² Zeit. f. Heilk., 1900, No. 11.³ Ann. de l'Institut Pasteur, Nov. 25, 1900.⁴ Correspondenzbl. f. Schweiz. Aerzte, June 15, 1901.⁵ Deut. Arch. f. klin. Med., Bd. LXIX, H. 3 u. 4.⁶ Münch. med. Woch., Mar. 19, 1901.⁷ Le Bull. Méd., No. 69, 1900.⁸ Phila. Med. Jour., Dec. 1, 1900.⁹ Berlin. klin. Med., June 10, 1901.¹⁰ Wien. klin. Woch., Oct. 4, 1900.¹¹ Ibid.¹² Vratich, Feb. 3, 1901.¹³ Bull. Gén. de Thérap., Feb. 8, 1901.

hyperacidity of the stomach, and in simple or tuberculous dyspepsia. The metvanadate of sodium is used in the same conditions in the dose of $\frac{1}{6\frac{1}{2}}$ of a grain taken $\frac{1}{2}$ hour before the two chief meals. The administration is not continued for more than 4 days consecutively.

Sodium Salicylate.—Williamson¹ reports on 20 cases of diabetes treated with sodium salicylate in large doses (75 to 80 grains daily). He believes the drug is a useful adjuvant, and has a marked effect in diminishing the sugar in the urine. Van Noorden² states that in certain cases in which it seems necessary to increase the amount of carbohydrates ingested the use of sodium salicylate is followed by a diminution of sugar in the urine, or, rather, the sugar excretion is held in check notwithstanding the more liberal diet. Pruritus and intestinal disturbances are also favorably influenced by the salicylates. Chauffard³ claims that salicylates, in daily doses of from 15 to 30 grains, are the most important remedies in the prophylactic treatment of hepatic colic.

Sodium Succinate.—Hope⁴ states that this drug, in doses of 5 grains every 3 hours, is superior to all others in the treatment of catarrhal jaundice.

Sodium Sulphate.—Buchanan⁵ reports 300 cases of acute dysentery treated with salines, with only 3 deaths. These cases, added to 555 previously reported with 6 deaths, make a total of 855, with a mortality of a little over 1%. The average stay in the hospital was 11 days. One dram of sodium sulphate dissolved in an ounce of fennel-water was given 4, 6, or 8 times a day. The dose was repeated on the following day until the stool had been inspected. The saline was continued until every trace of mucus and blood had disappeared. The author does not consider this method safe for chronic or relapsing cases with ulceration of the colon. Aviragnet⁶ also claims remarkable curative results from the use of sodium sulphate (5 to 15 grams a day) in the dysenteriform colitis of childhood.

Strophanthus.—MacLaren,⁷ in making a comparative study of the diuretic action of digitalis, strophanthus, and diuretin, found that strophanthus in 8 out of 13 cases caused an increase of the fluid constituents of the urine, and of the urea in 10 cases; but neither fluid nor solids were so largely increased as under the administration of digitalis. He found that strophanthus was not so well borne as digitalis, gastrointestinal symptoms occurring on the third or fourth day in 10 out of 13 cases, actual vomiting taking place in 4 of these. The dose recommended is 5 minims of the tincture every 4 hours.

Strychnin.—Robecchi⁸ concludes from experiments that this drug has no direct action on uterine contraction, and that any influence that it may exert as an ecbotic is the result of its general action.

Suprarenal Extract.—(See also Adrenalin.) McKenzie⁹ reports a

¹ Brit. Med. Jour., 1901, No. 2100.

² Dent. Praxis, 1901, No. 1, S. 1.

³ La Semaine Méd., 1901, No. 1.

⁴ Med. Council, Feb., 1901.

⁵ Brit. Med. Jour., Apr. 13, 1901.

⁶ Ann. de Méd. et Chir. de l'Enf., Jan. 1, 1901.

⁷ Med. Chronicle, Sept., 1900.

⁸ Gaz. degli Osped., 1900, No. 69.

⁹ Brit. Med. Jour., Apr. 27, 1901.

case of obstinate epistaxis which was almost immediately arrested by the application of an aqueous solution of suprarenal extract. Munro¹ claims to have obtained good results in acne rosacea from the use of the extract both locally and internally. Floersheim² holds that suprarenal gland is the most rapidly acting heart stimulant, and cites 82 cases of heart-disease in which he employed this drug internally (3 grains) with distinct benefit. Hönigsberger³ has employed adrenal extract in 20 cases of rachitis with disappointing results. Somers⁴ reports unfavorably upon the internal use of suprarenal gland in hay-fever. Edel⁵ reports a case of Addison's disease which improved under the use of suprarenal capsule.

Tannalbin.—Preiss⁶ obtained good results with this drug in 15 cases of acute catarrh of the small bowel. In colitis tannalbin was without effect.

Tannoform.—Strassburger⁷ has found tannoform, used as a dusting-powder in the strength of 1 : 3, very efficacious in the night-sweats of tuberculosis. Nolda⁸ also reports favorably on the tannoform treatment of night-sweats.

Tellurium.—Gies,⁹ from his experiments on dogs, concludes that large but nontoxic doses of tellurium compounds do not materially affect metabolism in dogs brought to a state of nitrogen-equilibrium, even when dosage is continued for a week. These substances appear to stimulate proteid catabolism only slightly. They increase somewhat the weight of dry matter in the feces, and diminish, in a small degree, the absorption of fat. They render the urine dark brown in color, but do not affect it otherwise. Excessive doses induce somnolence and severe gastroenteritis. Tellurium compounds, even in small proportion, markedly arrest the secretion of the acid in the stomach—the direct cause, probably, of the indigestion brought about not only in dogs, but also in man. Tellurium is eliminated in metallic form in the feces; as methyl-tellurid in the breath, urine, feces, and epidermal secretions; and in a soluble form, in small quantity, in the urine and bile. Neusser, Pohorecki, Combemale, and Dubiquet have found sodium and potassium tellurate, in daily doses of $\frac{1}{3}$ to $\frac{3}{4}$ of a grain, highly effective in controlling the night-sweats of tuberculosis. The experiments of Gies indicate that the alliaceous odor imparted to the breath is about the only objectionable feature constantly following the use of therapeutic amounts of tellurates.

Thallium Acetate.—Buschae,¹⁰ having observed 2 cases of alopecia following the use of thallium acetate for night-sweats, undertook an experimental investigation of the drug. He found that the drug also caused alopecia in white mice when given internally, but not when applied locally.

Thiocol.—This is the potassium salt of guaiacol-sulphonic acid. It has advantages in being tasteless, odorless, and freely soluble in water.

¹ Treatment, Mar., 1901.

² Münch. med. Woch., Apr. 16, 1901.

³ Münch. med. Woch., No. 52, 1900.

⁴ Therap. Monatshefte, Mar., 1901.

⁵ Phila. Med. Jour., Mar. 23, 1901.

⁶ N. Y. Med. Jour., May 4, 1901.

⁷ Phila. Med. Jour., Dec. 8, 1900.

⁸ Vratich, XXII, No. 7.

⁹ Berlin. klin. Woch., July 1, 1901.

¹⁰ Berlin. klin. Woch., Dec. 31, 1900.

The usual dose is from 45 to 90 grains a day, but much larger doses are sometimes given with advantage. The following writers have spoken favorably of the drug in tuberculosis: Braun,¹ Goldmann,² Mendelsohn,³ and Kaplansky.⁴ Fassano⁵ recommends the following insufflation in laryngeal tuberculosis: thiocol, $1\frac{1}{2}$ to $2\frac{1}{4}$ grains; cocain, 6 grains; boric acid, 15 grains.

Thiosinamin.—This compound, which is chemically allyl sulpho-carbimid, is prepared from the oil of mustard. It has been highly recommended by von Hebra, Unna, Hans, Latzko, and others as a resolvent in cicatrices, keloid, chronic glandular enlargements, lupus, urethral stricture, and perimetric inflammations. It has been given by the mouth in capsules in doses of $\frac{1}{2}$ to 3 grains, and hypodermically in the form of from 5% to 15% solutions. Unna has recommended it locally in the form of soaps and plasters. Juliusberg⁶ has found it very useful in keloid scars, scleroderma, and allied skin affections, but not in lupus. The author administered hypodermically $1\frac{1}{2}$ grains in 10% aqueous solution, every other day, in the interscapular region. Robinson⁷ also reports favorably on the use of thiosinamin.

Thyroid Extract.—Murray⁸ reviews the results of 10 years' use of thyroid extract in therapeutics. According to the author it is chiefly useful in conditions in which there is disease or destruction of the thyroid gland, such as myxedema and cretinism. In simple parenchymatous goiter of adolescents it is particularly useful. It has also been found of service in psoriasis, ichthyosis, and tertiary syphilis. Pringle⁹ is of the opinion that thyroid treatment is a valuable adjunct in the treatment of lupus when excision or crasion is not applicable. He quotes 2 cases as positive cures. Weber¹⁰ reports a case of psoriasis which recovered under thyroid extract, 5 grains thrice daily for 2 months. Debove¹¹ believes that thyroid extract is of value in obesity only in those cases in which myxedema can be regarded as a cause. He has observed serious harm from its use, and in one case sudden death. Montgomery¹² has found thyroid extract efficacious in uterine hemorrhage from nonmalignant conditions, near the climacteric, and also in some cases of sterility. Jones¹³ reports a case of hemophilia in which thyroid extract proved effective. Easterbrook¹⁴ reports 12 recoveries from large doses of thyroid extract in 100 cases of insanity which were not hopeless, but were found to be intractable under ordinary methods of treatment. The best results were obtained in the insanities connected with child-bearing. In the experience of Dennis¹⁵ thyroid extract will sometimes prolong life in cancer, retard ulceration, control hemorrhage, dispel disagreeable odor, and relieve pain, but it will not cure. Coppez¹⁶ reports

¹ Klin.-therap. Woch., VI, No. 38.

² Canad. Jour. of Med. and Surg., Jan., 1901.

³ Deut. Aerzte-Zeit., No. 21, 1900.

⁴ Merck's Arch., Mar., 1901.

⁵ Dent. med. Woch., Aug. 29, 1901.

⁶ Practitioner, vol. LXVI, 1901.

⁷ Post-Graduate, No. 9, 1900.

⁸ Internat. Med. Mag., Nov., 1900.

⁹ Scottish M. and S. Jour., Dec., 1900.

¹⁰ Therap. Month., June, 1901.

¹¹ Klin.-therap. Woch., No. 23, 1900.

¹² Merck's Arch., June, 1901.

¹³ Polyclinic, Sept., 1900.

¹⁴ La Semaine Méd., Mar. 13, 1901.

¹⁵ Brit. Med. Jour., Nov. 10, 1900.

¹⁶ Jour. Am. Med. Assoc., Oct. 19, 1901.

5 cases of optic neuritis produced by thyroid extract in patients who were taking the drug for obesity. The author states that the prognosis is favorable if the condition be recognized and the treatment suspended.

Trional.—Popiteau¹ calls attention to the solubility of trional in paraldehyd, and states that solutions of the two drugs are several times more active than either drug singly. He recommends as an excellent somnifacient, trional 1 part, paraldehyd 1 part, and almond oil 15 parts. Rosenfeld² has collected 8 instances of death following the use of trional, and reports a case of his own. Church³ also reports a case of fatal poisoning from the prolonged use of trional. Hart⁴ reports an instance of multiple neuritis following the use of trional.

Tuberculin.—Goetsch⁵ states that he has treated, during the last 10 years, 224 cases of tuberculosis with tuberculin. In the majority of these cases no other treatment was employed. His results are remarkably favorable. He never employs the remedy in patients with slightest rise of temperature. He never increases the dose when the preceding dose has produced any reaction whatever. Upon the day of the injection and the day following the injection the patient must remain in bed to avoid reaction. The initial dose was 0.0001 mg. of old tuberculin. If the old tuberculin was not tolerated, T. R. was substituted in doses of 0.001 mg. As soon as the patient could tolerate 0.1 mg. of T. R. old tuberculin was substituted, beginning with 0.0002 to 0.001 mg. The dose of the latter was cautiously increased until the patient could take 1.0 mg. without reaction. Heron⁶ cites a number of cases illustrating the beneficial effects derived from a careful and intelligent use of tuberculin after the method suggested by Goetsch.

Urea.—Harper⁷ claims to have obtained remarkable results in various forms of tuberculosis from the use of urea. The remedy was given by the mouth in doses of from 40 to 60 grains, and also by subcutaneous injection in about the same amounts. Buck⁸ also found urea equally effective in 7 cases of lupus.

Urotropin.—Cambridge⁹ concludes from a careful study of the action of this drug that it is not eliminated as free formaldehyd. It is possible that a new compound is formed with acid urine. Typhoid cystitis, suppurating pyelitis, and pyelitis with calculus, as well as simple colon infection of the bladder, are favorably influenced by urotropin; but gonorrheal or tuberculous cystitis does not seem to be benefited. In using the drug it is essential that the urine be rendered acid. Favorable reports upon urotropin as a urinary antiseptic have also been published by Suter,¹⁰ Suppan,¹¹ and Simpson.¹² Brown¹³ reports 2 cases of hematuria, both in subjects with typhoid fever, from the use of urotropin in doses of 10 grains thrice daily.

¹ Thèse de Paris, 1900.

³ Am. Med., Nov. 9, 1901.

⁵ Deut. med. Woch., June 10, 1901.

⁷ Lancet, June 15, 1901.

⁹ Lancet, Jan. 19, 1901.

¹¹ Wien. med. Blätter, July 12, 1900.

² Berlin. klin. Woch., No. 20, 1901.

⁴ Am. Jour. Med. Sci., Apr., 1901.

⁶ Phila. Med. Jour., Sept. 21, 1901.

⁸ Phila. Med. Jour., Sept. 14, 1901.

¹⁰ Correspondenzbl., Jan. 15, 1901.

¹² Therapist, vol. VII, 1901.

¹³ Brit. Med. Jour., 1901, No. 2111.

Yeast.—Nobécourt¹ states that yeast attacks nascent glucose formed from the conversion of carbohydrates, and that experiments have shown that a quantity of glucose which would produce alimentary glycosuria ceases to do so if a small amount of yeast is administered at the same time. It may therefore be possible, by the administration of yeast, to permit diabetic patients to take a larger quantity of carbohydrate food. A dose of a tablespoonful may be given after meals. Roos² states that beer yeast exerts a most favorable influence on habitual constipation. Fresh yeast dried at a temperature of 30° C. may be given 2 or 3 times a day in doses of 50 centigrams, or half this amount of sterilized yeast may be prescribed. The beneficial effects of this treatment are said to be manifest from the second day of its inception. Rarely a little flatulence or griping may be produced by the fresh yeast.

Yohimbin.—This is an alkaloid or a mixture of alkaloids obtained from the bark of Cameroon tree and a number of the Rubiaceæ. According to Löwy³ it has a marked effect on the vascular supply of the genital organs. Doses of from $\frac{1}{10}$ to $\frac{1}{6}$ of a grain have a pronounced aphrodisiac influence. Both Mendel and Eulenberg have spoken favorably of its action in sexual neurasthenia. Berger⁴ has given yohimbin in 5 cases of sexual incompetence with favorable results. He advises that $\frac{1}{12}$ of a grain be the initial dose, and that, if the desired effect is not obtained in a week, $\frac{1}{6}$ or $\frac{1}{5}$ of a grain be then given. Kravkoff,⁵ of St. Petersburg, from a series of carefully conducted experiments on animals and man, concludes that it is without aphrodisiac action, that the congestion of the sexual organs is due to its vasodilating effect, and that doses of $\frac{1}{12}$ of a grain not infrequently excite salivation, nausea, clouded mind, and even syncope.

Zomotherapy.—This consists in the feeding of tuberculous patients with large quantities of raw meat and expressed meat juice. The word was first proposed by Richet and Héricourt.⁶ These observers found that when dogs were fed with raw meat the development of experimental tuberculosis was retarded; while, on the other hand, control animals, fed upon ordinary food, quickly succumbed to the inoculation of tubercle bacilli. Josias and Roux⁷ report that the administration of raw meat juice in the treatment of tuberculosis in children is attended with good results, even in the most advanced cases, although the best results are obtained when the malady is still in its early stage. The juice should be freshly prepared, and in summer it should be placed on ice when not wanted for immediate use. The authors administer, on an average, 1 pint a day. Fränkel and Sobernheim,⁸ from their own experience, conclude that this method of treatment is very much overrated, as their results do not coincide with those of Héricourt and Richet and other investigators.

¹ La Semaine Méd., No. 2, 1901.

³ Therap. Monatshefte, 1900, Bd. XIV.

⁵ Therap. Month., Aug., 1901.

⁷ Bull. Gén. de Thérap., Feb. 23, 1901.

² La Semaine Méd., Oct. 31, 1900.

⁴ Deut. med. Woch., Apr. 25, 1901.

⁶ La Semaine Méd., 1899, p. 404.

⁸ Berlin. klin. Woch., July 15, 1901.

PHYSIOLOGY.

By G. N. STEWART, M.D.,
OF CLEVELAND, OHIO.

BLOOD AND LYMPH.

Globulicides.—[The investigation of the action of globulicidal substances is attracting much attention, particularly in connection with the question of the mechanism of natural or acquired immunity against such substances.] Gürber¹ has minutely studied the action of the blood-serum of numerous mammalian animals on the red corpuscles of other mammals. He finds that the stronger the globulicidal power of a serum, the more resistant are the corpuscles of the animal to the serums of other animals. Thus, cat's serum destroys the corpuscles of all the animals investigated, while the corpuscles of cat's blood are not affected by the serum of any of them. The [commonly accepted] view that the globulicidal action of foreign serums depends on the proteids is confirmed. J. Pohl,² starting from Langer's³ observation that the serum exerts a protective influence against the globulicidal action of the poison of the bee, endeavored to determine whether serum also protects against other poisons. He found that, as a matter of fact, serum does possess a protective power against solanin, and that serum obtained from a rabbit to which solanin has been repeatedly administered in small doses has a much greater protective action than ordinary serum. He believes that in this case the antibody is acid sodium phosphate, which prevents the entrance of the poison into the corpuscles. These experiments have been adversely criticized by E. P. Bashford,⁴ but the main results have been confirmed by Pohl⁵ in another series of observations, and to a certain extent by E. Hédon,⁶ who has demonstrated that in a solution of $\text{NaH}_2\text{P}_2\text{O}_4$ of 1% strength, the corpuscles resist twenty times the toxic dose of solanin, while by adding this salt to serum one can raise the protective power so much that the corpuscles are not decolorized by fifty to one hundred times the dose which would be toxic in NaCl solution. On the other hand, the phosphate is not protective against saponin. Hédon shows further that solanin, saponin, cyclamin, sapotoxin, and digitalin all have a much less toxic action on the corpuscles in serum than in isotonic NaCl solution. The serum still retains its protective power against solanin when its salts have been removed by dialysis, but ether deprives it of its power against solanin

¹ Fick's Festsch., 1899, S. 121.

² Arch. de Pharmacodyn., t. VII, p. 1.

³ *Ibid.*, t. VI, p. 181.

⁴ *Ibid.*, t. VIII, p. 101.

⁵ *Ibid.*, p. 437.

⁶ *Ibid.*, p. 381; Compt. Rend. Soc. de Biol., 1901, p. 229.

and cyclamin, and, according to Ransom,¹ of its power against saponin also. [Hédon speculates as to the manner in which the serum exerts its protective action, but his facts seem to us more worthy of mention than his hypotheses.]

Selective Power of Colored Corpuscles.—G. N. Stewart,² using the colored corpuscles as convenient objects on which to test whether the "selective" activity of cells for certain substances is ever dependent on their physical or chemie structure and independent of their life, comes to the conclusion that this is actually the case as regards the power of the corpuscles to absorb NH_4Cl and to reject NaCl . Under conditions incompatible with life (*e. g.*, in blood which has stood as long as 12 days without being laked, or in blood fixed by formaldehyd) the corpuscles still take up NH_4Cl in preference to NaCl . There is this difference, however, between the living and the dead corpuscles, that in the case of the former there is a distinct period of resistance to the entrance of NH_4Cl , and this period is longer the fresher the blood. Saponin markedly increases the electric conductivity of the corpuscles (whether they are fresh, stale, or fixed by formaldehyd) by increasing their permeability to the ions of the blood.

Coagulation of the Blood.—There is for the moment a lull in the activity of research in this subject. Nevertheless, E. P. Pick and K. Spiro³ have published an important reinvestigation of the action of the products of peptic digestion. [This subject has aroused the liveliest interest ever since the discovery by Schmidt-Mulheim and Fano, about 20 years ago, that these products, when injected into the circulation, cause the blood to become incoagulable. It has been commonly assumed that the albumoses (and peptones), if not the only substances formed in the digestion of proteids by pepsin which are capable of producing this effect, are at any rate by far the most conspicuous.] Pick and Spiro, however, point out that none of the material hitherto used is above suspicion as to its chemie purity. They prove that the appearance of anticoagulant bodies when proteids are split up is not dependent on the action of ferments, for they also arise when proteolysis is accomplished by the aid of dilute acids or alkalies in the absence of ferments. Witte's "peptone" and the products obtained from raw fibrin by the action of acids owe their anticoagulant power, not to typical albumoses and peptones, but to some substance, mixed with these, which is easily destroyed by alcohol. Preparations can be obtained from the mucous membrane of the stomach and intestines which have a marked anticoagulant action, but are free from albumoses and peptones, or only contain traces of them. G. I. Kemp and H. Calhoun⁴ make the statement that [contrary to the accepted doctrine] leukocytes do not break down during normal coagulation, while blood-plates do.

Blood-formation.—B. Werigow and L. Jegunow⁵ bring forward

¹ Deut. med. Woch., Mar. 28, 1901.

² Jour. Physiol., vol. XXVI, p. 470.

³ Zeit. f. physiol. Chem., Bd. XXXI, S. 235.

⁴ Proc. Am. Physiol. Soc., Am. Jour. Physiol., vol. V, p. iv.

⁵ Pflüger's Arch., Bd. LXXXIV, S. 451.

evidence that the bone-marrow is not only the most important seat of formation of the colored corpuscles [as is generally admitted], but also a manufactory of white corpuscles. The intravenous injection of bacteria or their toxins excites the marrow to increased activity in this regard. In from 20 to 60 minutes after the injection large numbers of polymorphous leukocytes begin to pass by the veins of the marrow into the circulation. They draw the conclusion that if the marrow under pathologic conditions can form leukocytes it can also do so under normal circumstances, although possibly to a smaller extent. Roietzki,¹ on the other hand, obtained a negative result in comparing the blood of the arteries and veins of the marrow after injection of oil of turpentine. [But we may readily admit the contention of Werigo and Jegunow, that this negative result should not be allowed to weigh against a positive result, provided the latter has been established by a satisfactory method.] That even lymphocytes reach the blood by other channels than the lymphatics is shown by the observations of A. Biedl and A. von Decastello.² They find that ligation of the thoracic and subsidiary lymphatic ducts, or the production of a fistula of the thoracic duct, although leading to marked temporary diminution in the number of lymphocytes in the blood, does not occasion their total disappearance, even when the spleen has been previously extirpated. The polynuclear leukocytes are not at all lessened in number, but may be increased [a fact obviously in accord with the result of Werigo and Jegunow,³ but which one might also have been inclined to interpret as the expression of an ordinary febrile leukocytosis due to the operation, had not the authors excluded this by a rigid asepsis]. [The mechanism of the increase in the number of colored corpuscles which takes place at high altitudes has been much debated. Some writers, indeed, maintain that the increase is only an apparent one, due to diminution in the relative amount of plasma, while others believe that there is an actual new-formation of corpuscles.] A. Jaquet,⁴ having demonstrated in a former research (with Suter⁵) that in the mountains the total quantity of blood and Hb actually increases, has now investigated (in rabbits) the possible factors concerned, viz., temperature, light, dryness of the air, and air-pressure. He used the same method as before, washing out the whole of the blood and determining the Hb content of it. He arrives at the conclusion [which seems justified] that the essential factor is the diminution of the pressure of the air.

Estimation of Hb.—J. Haldane⁶ has made a valuable contribution to the technic of the estimation of Hb, which should prove especially serviceable for clinical use, by substituting for the carmin-tinted standard of Gowers' hemoglobinometer [whose liability to change has constituted a serious drawback to the apparatus] a tube containing a standard solution of CO hemoglobin made by saturating with coal-gas a 1%

¹ Arch. de Sci. Biol., St. Petersburg, v.

² Pflüger's Arch., Bd. LXXXVI, S. 259.

³ Arch. f. exper. Path. u. Pharm., Bd. XLV, S. 1.

⁵ Correspondenzbl. f. schweiz. Aerzte, 1898, No. 4.

⁶ Jour. Physiol., vol. XXVI, p. 497.

³ Loc. cit.

solution of ox or sheep's blood, of the average oxygen capacity of normal adults (18.5%). This is stable when kept in a sealed tube.¹

Lymph-formation.—Asher and his pupils² have continued their work on the formation of lymph. In conjunction with W. J. Gies³ he has investigated the influence of protoplasmic poisons, and has found that the action of Heidenhain's lymphagogs of the first class (such as extract of crab's muscle or leech extract) is suppressed or hindered by deep quinin-poisoning. In this Asher and Gies see a new proof that these agents, which are also "hepatic poisons," produce their effect through a physiologic rather than a physical mechanism, viz., increased activity of the liver. Arsenic, on the other hand, a typical "capillary poison," although it injures the visceral capillaries far more than these lymphagogs, causes a far smaller increase in the lymph flow. The action of the typical lymphagogs is, therefore, not due to a mere augmentation of the permeability of the capillaries. Further, the increase of lymph flow caused by the intravenous injection of crystalloid substances, like sugar, is not explained by the hydremic rise of blood-pressure, as Starling⁴ and others have supposed, since it continues for a considerable time after the death of the animal. The complete parallelism between the postmortem formation of saliva and the postmortem formation of lymph indicates that they are due to essentially similar physiologic processes. Asher and F. W. Buseh⁵ find additional support for this view of the action of the crystalloid lymphagogs in the fact that if sugar be injected intravenously after the withdrawal of as much blood as corresponds to the water which the sugar would attract from the tissues into the blood, the sugar-content of the blood sinks with astonishing slowness. It is this slow passage of sugar into the tissues, they say, and not the absence of a rise of blood-pressure, as Starling supposed, which in the case described is responsible for the lack of acceleration of the lymph flow. [They do not, however, attempt to explain why the sugar under these conditions passes so slowly out of the blood.] They also assert that the formation of urea from ammonium salts and of glycogen from sugar in the liver is accompanied by increased formation of lymph, while the same is true of the normal activity of the pancreas. The results of F. A. Bainbridge⁶ are also strongly in favor of the theory that lymph is a product of the activity of the organs. For example, stimulation of the chorda tympani and of the cervical sympathetic, and injection of pilocarpin lead to an augmentation of the flow of lymph from the submaxillary gland, but if atropin be given, stimulation of the chorda no longer affects the lymph flow [although, of course, owing to the vasodilator fibers in it, the capillary pressure must be increased just as before]. On the other hand, C. Sihler,⁷ in an elaborate study of the nerve-fibers surrounding the capillary blood-vessels, puts forward the suggestion that they may play an important part in

¹ Supplied by Hawksley, 357 Oxford Street, London.

² See YEAR-BOOK for 1900, p. 501.

³ Zeit. f. Biol., Bd. XL, S. 180.

⁴ YEAR-BOOK for 1896, p. 1101.

⁵ Zeit. f. Biol., Bd. XL, S. 333.

⁶ Jour. Physiol., vol. XXVI, p. 79.

⁷ Jour. Exper. Med., 1901, p. 493.

regulating the transudation of lymph through the capillary walls. Since in the submaxillary gland, according to him, the branches of the chorda do not pass to the gland-cells, but end on the capillaries, he attributes to these nerves not a direct, but an indirect influence on the glandular secretion. [If this function could be experimentally established, it would, of course, afford a decisive proof of the truth of Heidenhain's conception of the glandular or quasiglandular action of the capillary endothelium, and would indicate that the relation between glandular activity and lymph-formation is the reverse of what Asher supposes, the rate of lymph-formation determining the degree of glandular activity, and not *vice versâ*.]

THE CIRCULATION.

The Heart.—Additional support is given to the now very generally accepted view of the myogenic origin of the heart-beat by the observations of W. Straub¹ on the heart of *Aplysia*, in which no ganglion-cells have as yet been found. [The fact, however, that he has also been unable to demonstrate any extrinsic nervous regulation of the heart in this animal shows that we must not, without due consideration, transfer to the mammalian heart the results obtained in such simple forms.] H. E. Hering² discusses in considerable detail the question whether the excitability, contractility, and conductivity of the cardiac muscle are in reality separate properties, or merely three expressions of a single property (called by him reactivity), which it is convenient to formally distinguish. He decides the question in the affirmative, on the ground that there is no convincing proof that the heart can exhibit one of these properties in the absence of the other two.

The Compensation of Mitral Lesions.—The old doctrine, supported by wide clinical and pathologic experience, that valvular lesions at the aortic orifice are compensated by hypertrophy of the left ventricle, has in the last decade been ardently assailed by von Basch and his pupils. He supposes that the essential damage in mitral lesions is that the pulmonary vessels being overfilled, the lungs cannot expand properly in respiration, and the oxygenation of the blood is hindered. The right ventricle, it is true, hypertrophies, but this hypertrophy is merely an adaptation of the heart to prevent further dilation of its own cavities; and without compensating for the effects of the mitral lesion on the filling of the systemic circulation, only aggravates the respiratory trouble by still further distending the pulmonary vessels. Gerhardt³ combats this view on the strength of experiments on dogs, in which, by artificially increasing the pressure in the pulmonary artery, he obtained an increase of pressure in the left auricle and carotid artery. He therefore adheres to the classic doctrine that hypertrophy of the right ventricle does aid the systemic circulation and is a true compensation phenomenon.

¹ Pflüger's Arch., Bd. LXXXVI, S. 504.

² *Ibid.*, p. 533.

³ Arch. f. exper. Path. u. Pharm., Bd. XLV, S. 186.

Action of Ions on Lymph Hearts.—Anne Moore¹ extends the conclusions of Loeb² on the effects of Na and Ca ions on the rhythmic contraction of the heart to the lymph hearts of the frog. She shows that while contractions take place in a pure NaCl solution, they continue longer if a definite proportion of CaCl₂ or of some SO₄ compound be added to the solution. In another paper³ she proves that the action of the lymph hearts does not depend on the spinal cord [as some have supposed from the fact that they stop beating for a time after destruction of the cord]. The excised hearts will beat automatically if only they are placed in a proper solution.

Heart-nerves.—T. Muhr⁴ has confirmed the observation of Hunt⁵ that the vagus and accelerans behave as true antagonists. Nadine Lomakina⁶ has reviewed at great length the anatomic literature of the cardiac nerves and has added some original observations. [While the objective descriptions are valuable, we do not see in the paper any physiologic support for the view advanced, that the initiation of the rhythmic beat is a function exclusively of the intracardiac nerve plexuses, to which the writer seems to ascribe the mysterious powers formerly attributed to the ganglion-cells. There is, on the contrary, good and growing evidence not only of the myogenic origin of the cardiac contraction, but of the important part played by the muscular tissue itself in the coordination of the various divisions of the heart.⁷] [The observation of E. von Cyon,⁸ that standstill of the heart sometimes occurs when the circulation in the medulla is interrupted, and that the beat begins again when the circulation is restored does not, when properly interpreted, lend any support to his somewhat archaic view that the cardiac contraction depends on the medullary centers; for the inhibitory center may be excited by anemia.]

Reflex Cardiac Inhibition.—H. Friedenthal⁹ inquires as to the cause of that "reflex cardiac death" which is an occasional consequence of intense psychic influences (anxiety, fright, etc.). He discusses the question how it is that a natural excitation of the vagus can last so long as to cause death, while, as is well known, we are not usually able to stop the heart for so long a time by the strongest artificial stimulation of the vagi in their course. He concludes, from experiments on rabbits [a kind of animal, by the way, not particularly well adapted for the study of psychic effects], that there are several factors in the reflex cardiac death in man, of which the most important are the simultaneous stimulation of the cardioinhibitory and cardioaugmenter centers, the want of oxygen due to the respiratory standstill, and the increase of blood-pressure occasioned by the excitation of the vasomotor center. All these effects would follow a general excitation of the medulla in consequence of a cortical storm. T. G. Brodie and A. E. Russell¹⁰

¹ Am. Jour. Physiol., vol. v, p. 87.

² YEAR-BOOK, 1901, p. 543.

³ *Ibid.*, p. 196.

⁵ YEAR-BOOK, 1898, p. 977.

⁴ Arch. f. (Anat. u.) Physiol., 1901, S. 235.

⁶ Zeit. f. Biol., Bd. XXXIX, S. 377.

⁷ Cf. W. T. Porter, YEAR-BOOK, 1900, p. 502.

⁸ Compt. Rend. Soc. de Biol., 1900, t. XXVIII, 4.

⁹ Arch. f. (Anat. u.) Physiol., 1901, S. 31.

¹⁰ Jour. Physiol., vol. XXVI, p. 92.

state that of all the afferent fibers of the vagus, those which produce the most marked reflex inhibition of the heart are the pulmonary fibers. The cardiac fibers are much less effective. These pulmonary nerves also influence the respiratory and vasomotor centers; the respiration is temporarily arrested and the blood-pressure falls through vasodilation when they are excited. [It is of interest in connection with death during the administration of anesthetics that the alveolar nerves can be chemically stimulated when irritant vapors, such as CHCl_3 , HCl , NH_3 , Br , or formaldehyd, are inhaled through a tracheal cannula.]

Blood-pressure.—W. H. Howell and C. E. Brush¹ discuss [in luminous fashion] the principles underlying the measurement of the blood-pressure in man by various kinds of sphygmomanometers and the interpretation of the results yielded by such apparatus. [This paper forms a timely contribution to a subject which has now acquired considerable clinical importance and promises to become more important in the future.] J. H. McCurdy,² using a sphygmomanometer which is a modification of that employed by Hill³ and Riva-Rocci, has measured in 23 men the effect of maximum muscular effort on the blood-pressure. There is a great and sudden rise, due largely to the increase in the intrathoracic and intraabdominal pressure, succeeded by a rapid return to the normal.

Vasomotor Nerves.—The histologic discoveries of Huber, Gulland,⁴ and others, already reported, have led to renewed efforts on the part of L. Hill⁵ (with J. J. R. Macleod) to obtain experimental evidence of the existence of vasomotor nerves for the brain, but again with a negative result. [The presence of nerve-fibers around the cerebral blood-vessels admits of no doubt, and their distribution is very extensive, since, as W. Hunter⁶ has shown, they are to be found not only on the vessels of the cortical gray matter, but also in the gray matter of the cord. But their function remains enigmatic.]

[There is a considerable body of evidence that the tone of the blood-vessels is, or under exceptional circumstances may be, in part maintained by peripheral vasomotor centers. The experiments of Goltz and Ewald⁷ on the gradual recovery of vasomotor tone after extensive destruction of the cord can scarcely be explained except on the hypothesis that some peripheral mechanism gradually assumes control of the vessels. We doubt, however, whether the evidence is materially strengthened by such observations as those of L. Asher and J. P. Arnold,⁸ who state that when the circulation in the spinal cord (including the bulb) is gradually but completely interrupted, so as to lead to the death of its centers, the vasomotor tone still retained is sufficient for the maintenance of the circulation. The difficulty here lies in the interpretation of the results, since it seems by no means easy to be quite sure at any moment of the precise amount of disturbance caused in the cerebrospinal centers by anemia.]

¹ Mass. Med. Soc., June 12, 1901.

³ YEAR-BOOK, 1899, p. 955.

⁶ Jour. Physiol., vol. XXVI, p. 394.

⁷ YEAR-BOOK, 1897, p. 1178.

² Am. Jour. Physiol., vol. v, p. 95.

⁴ YEAR BOOK, 1900, p. 504.

⁶ *Ibid.*, p. 465.

⁸ Zeit. f. Biol., Bd. XL, S. 271.

RESPIRATION.

[It was shown long ago by Kratschmer that the reflex expiratory standstill caused in rabbits by inhalation of such sharp-smelling substances as NH_3 , acetic acid, and tobacco smoke is due to afferent impulses passing along the trigeminus fibers from the nose, and is still obtained after section of the olfactory nerves.] H. Beyer¹ confirms this statement, but finds that the olfactory nerves can also serve as afferent paths for the reflex expiratory standstill produced by other substances, like xylol and CS_2 .

DIGESTION.

Movements of the Stomach.—Meltzer² has shown (in the dog) that while electric or chemie stimulation of the serous coat of the intestine readily causes reflex contractions of the stomach, it is much more difficult to elicit such contractions by stimulation of the mucous membrane. K. Glaessner³ confirms these results for the frog. [According to him, the clinical fact that in cases of tumor of the intestine violent contractions of the stomach and fecal vomiting first appear when the tumor has broken through the intestinal wall and involved the serosa, is related to this comparative insensibility of the mucosa. That the mucosa has a low degree of irritability seems to him an advantageous provision for normal digestion, for otherwise the ingesta would cause prodigious mechanical and chemie stimulation. It is very easy, however, to overdo this argument, for nobody doubts that the mechanical stimulation of the food in the pyloric end of the stomach and in the intestines is a very efficient stimulus to *local* contraction, nor that the presence of the products of digestion or of a dilute acid in the intestine is an efficient chemie stimulus to the production of alkaline succus entericus. The difference in the result of stimulating the mucosa and the serosa may be due to a difference in the nervous connections, as well as to a difference in excitability.]

Action of Ptyalin.—In opposition to the usual view that the amount of digestive work performed by a ferment under given conditions increases with the quantity of ferment present, T. Maszewski⁴ and P. Bielfeld,⁵ while they disagree in certain respects, come independently to the conclusion that in the case of ptyalin the quantity of ferment, within the limits employed, is without influence on the amount of sugar formed. According to Bielfeld, the greater the absolute quantity of starch in the digestive mixture, the more sugar is produced. "How problematic," exclaims Maszewski, "do all modern methods of estimating the quantity of an enzyme appear in the light of these results?" [And if his observations turn out to be correct, others will echo his exclamation. But it would appear doubtful whether, in any case,

¹ Arch. f. (Anat. u.) Physiol., 1901, S. 261.

² YEAR-BOOK, 1897, p. 1175; 1898, p. 986.

³ Pflüger's Arch., Bd. LXXXVI, S. 291.

⁴ Zeit. f. physiol. Chem., Bd. XXXI, S. 58.

⁵ Zeit. f. Biol., Bd. XLI, S. 350.

they can be extended to all the digestive ferments. For F. Krüger¹ reports that in peptic digestion the quantity of digestive products formed increases with the amount of pepsin, although, it is true, not in the same proportion. He finds also that when the amount of pepsin is kept constant, the quantity of products increases with the quantity of proteid in the digestive mixture.]

KCNS in Human Saliva.—Mendel and Schneider² and Schneider³ give a résumé of observations on this apparently ever-interesting theme. In 225 students they only once failed to obtain a reaction by the Solera-Krüger method. By concentrating a large amount of the saliva of this individual the reaction was obtained. G. N. Stewart⁴ states that in 100 students whose saliva was tested by the Fe_2Cl_6 reaction the result was positive in every case but one, and in this person a trace of sulphocyanid was detected 3 days later (without concentration of the saliva).⁵ [We may therefore conclude without hesitation that the assertions of various writers that sulphocyanic acid is frequently absent from human saliva are inaccurate.]

Submaxillary Gland.—J. L. Bunch⁶ has investigated by the plethysmographic method the changes which take place in the volume of this gland during secretion caused by stimulation of its nerves or by drugs. He reports that activity of the gland leading to secretion is in all cases accompanied by a diminution in its volume, so marked that it generally more than compensates for any simultaneous vasodilation. From a comparison of the increase of volume which the vasodilation could produce, and the amount of the secretion, he reaches the conclusion that at least nine-tenths of the secretion is derived from the extravascular portions of the gland. Since, as Bainbridge⁷ has demonstrated, there is no diminution of the lymph flow from the gland, but rather a slight increase during the period of stimulation, we must, according to Bunch, assume that the secretory nerves influence solely the secretory cells, the increased exudation from the blood-vessels being a secondary phenomenon determined entirely by the metabolic changes in the cells, and lagging behind these to a very considerable extent. [While this may be the case, it is obvious, from the experiments of J. Barcroft,⁸ that the blood, in passing through the submaxillary gland, loses water when the chorda tympani is stimulated, and that this loss of water begins with great promptitude, being in the first half-minute nearly as great as, and after the first minute greater than, the quantity of saliva secreted. We confess we do not quite see how this is taken account of in Bunch's calculation.] Bunch⁹ has failed to confirm the theory of Mathews,¹⁰ that the secretion caused by stimulation of the sympathetic is due to the contraction of unstriated muscular fibers in the

¹ *Ibid.*, S. 378, 467.

² *Proc. Am. Physiol. Soc.*, *Am. Jour. Physiol.*, vol. IV, p. vii.

³ *Am. Jour. Physiol.*, vol. V, p. 271.

⁴ *Manual of Physiol.*, fourth ed., London, 1900, p. 296.

⁵ *Cf. YEAR-BOOK*, 1900, p. 508.

⁶ *Brit. Med. Jour.*, Sept. 22, 1900; *Jour. Physiol.*, vol. XXVI, p. 1.

⁷ *Proc. Physiol. Soc.*, *Jour. Physiol.*, vol. XXV, p. xvi.

⁸ *Ibid.*, p. 479.

⁹ *Loc. cit.*

¹⁰ *Ann. N. Y. Acad. Sci.*, No. 14, 1898.

gland. Barcroft¹ makes the further announcement that during secretion caused by excitation of the chorda the amount of O taken from, and of CO₂ given up to, the blood by the submaxillary gland is three or four times greater than in the resting gland. After paralysis of the secretory fibers of the chorda by atropin, stimulation of the nerve produces no increase in the intake of O, although the output of CO₂ is still markedly increased. A. P. Mathews² throws further light upon the relations between blood flow and salivary secretion by the discovery that when the blood-supply has been cut off for 12 to 25 minutes from the submaxillary gland, a rapid secretion is set up on readmission of the blood. He considers the secretion a consequence of increased osmotic pressure in the gland-cells, following the temporary deprivation of O. The secretion is paralyzed by atropin. [But it is impossible to accept the deduction which he draws, that atropin must act directly on the gland-cells since nerve-cells would be placed *hors de combat* by being deprived of blood for so long a time; for even if we admit that this would be the case for nerve-cells, there is no proof that the nerve-endings of the chorda would be paralyzed, and the common view is that atropin paralyzes these nerve-endings, not the intraglandular nerve-cells.] The effect of alterations in the composition of the blood on the salivary secretion has been investigated by L. Asher and W. D. Cutter.³ They determined the influence on the amount and composition of the saliva secreted in response to stimulation of the chorda of the intravenous injection of concentrated solutions of NaCl, glucose, and urea. Although all three substances caused hydremic plethora, they affected the saliva very differently, glucose acting merely through the hydremia, NaCl both in this way and by exciting the gland-cells as a substance excreted in the saliva, and urea acting almost entirely as an excitant of the gland-cells.

Gastric Juice.—E. Weinland⁴ has made the curious discovery that in the pure gastric juice of elasmobranch fishes (dogfish, torpedo, skate) the acid is not HCl, but an organic acid. The proteolytic ferment is active in acid and to a smaller degree in alkaline solution.

Nerves of Pancreas.—Wertheimer and Lepage⁵ and L. Popielski⁶ show that reflex pancreatic secretion can be excited by stimulation of the duodenum, jejunum, or ileum with acid, without any participation of the central nervous system. The first-named observers removed the solar ganglia and divided the celiac and superior mesenteric plexus, as well as the vagus and the thoracic sympathetic chains, without hindering this reflex secretion. They believe that the reflex centers must lie within the pancreas itself.

Spleen and Trypsin Formation.—A. Herzen⁷ and F. Badano⁸ produce further evidence in favor of Schiff's view that the spleen secretes a substance which possesses the property of changing protrypsin (the precursor of trypsin) into trypsin.

¹ Jour. Physiol., vol. XXVII, p. 31.

² Am. Jour. Physiol., vol. IV, p. 482.

³ Zeit. f. Biol., Bd. XL, S. 535.

⁴ *Ibid.*, Bd. XLI, S. 275.

⁵ Jour. de Physiol. et Path. gén., t. III, pp. 335, 689.

⁶ Pflüger's Arch., Bd. LXXXVI, S. 215.

⁷ Pflüger's Arch., Bd. LXXXIV, S. 115.

⁸ Clin. Med. Ital., Milan, No. 2, 1900.

Ligation of the Bile-duct.—M. Doyon, E. Dufourt, and J. Pariot¹ tied the bile-duct (in dogs) between two ligatures, and excised the intermediate portion. Some of the animals survived several months, although they became rapidly anemic, the number of red corpuscles being in general diminished to half the normal. In time some of the symptoms were alleviated; the icterus became less intense, although till the end both albumin and bile pigments were present in the urine. A subacute sclerosis invaded the portal spaces, and at length the lobules. The obstruction to the portal circulation thus produced was partially obviated by the formation of anastomoses between the portal system and the venæ cavæ by means of the vessels of the omentum. The authors see in this result a support for the idea, which has already found its way into surgery, of fixing the omentum to the abdominal wall in cirrhosis with ascites.

Cellulose Digestion.—E. Müller² has been unable to confirm the statement of K. Knauth³ that a cellulose-dissolving enzyme exists in the hepatopancreas of the carp, even though he had the advantage of repeating Knauth's experiments under Knauth's own guidance. On the other hand, he confirms the discovery of Biedermann and Moritz,⁴ that a ferment of this nature is present in the intestine of the garden snail, which rapidly produces sugar from cellulose. In herbivorous mammals no such ferment has been found; and although cellulose can be split up by bacteria, sugar is not among the products. In this case the cellulose makes only an insignificant contribution to the metabolism of the animal.

ABSORPTION.

H. Friedenthal⁵ continues the discussion of the general problem of absorption,⁶ and further elaborates the view that the secret of so-called "selective" absorption is to be found in the structure of protoplasm. He points out that it is not necessary for absorption that a substance should be soluble in water; to be "soluble in protoplasm" is enough. Thus, oleic acid, though practically insoluble in water, is taken up by the colored blood-corpuscles, by the nerve-cells of the cerebral cortex, and by the intestinal epithelium. On the contrary, milk-sugar, though very soluble in water, is practically insoluble in protoplasm, for it is absorbed in exceedingly small amount by blood-corpuscles, vegetable cells, and the epithelium of the intestine. [We fail to see how the use of the phrase "soluble in protoplasm" helps us much. If it has any definite meaning at all, it seems to be synonymous with "capable of being absorbed by protoplasm," and it does not need a very subtle dialectic to prove that a substance capable of being absorbed by protoplasm can be taken up by protoplasmic structures. The attempt to bring all cells under the same generalization as regards the substances they absorb seems to us entirely premature, as is suffi-

¹ Jour. de Physiol. et Path. gén., t. III, p. 731.

² Pflüger's Arch., Bd. LXXXIII, S. 619.

³ YEAR-BOOK, 1899, p. 958.

⁴ *Ibid.*, p. 958.

⁵ Arch. f. (Anat. u.) Physiol., 1901, S. 222.

⁶ Cf. YEAR-BOOK, 1901, p. 553.

ciently shown by the fact that glucose, which, like lactose, is taken up with difficulty by the red corpuscles, is greedily absorbed by the intestine. It is true that R. Höber¹ assumes that the absorption of carbohydrates from the intestine takes place solely through the interepithelial substance and not at all through the cells, but this assumption, as we have previously pointed out,² will not bear examination. He bases it mainly on the alleged fact that carbohydrates and salts are taken up from the intestine at a rate proportional to their diffusibility, while substances which are known to pass into the cells are absorbed at a relatively greater rate.] Waymouth Reid³ has supplied fresh proof of the inaccuracy of Höber's results by demonstrating that in the normal intestine the amount of maltose or glucose taken up is independent of their relative diffusibility. Only after very severe injury to the mucous membrane does the velocity of absorption become proportional to the velocity of diffusion. The observations of O. Cohnheim⁴ on absorption from the urinary bladder once more emphasize the extraordinary differences between cells of different categories as regards their absorptive "likes and dislikes." A liquid, he says, introduced into the bladder alters as little as in a glass vessel, unless the mucous membrane has been injured. The bladder-wall is neither a diffusion membrane, like parchment paper, nor a semipermeable membrane which permits the passage of water, though not of salts, like the envelopes of many vegetable cells, of the red blood-corpuscles, etc. It differs entirely from the intestinal wall, through which we have usually a rapid stream in one direction only, and also from the peritoneum, through which an exchange may go on which is not essentially different from that in a parchment-paper tube.

Absorption of Fat.—[The controversy as to the proportion of the fat of the food which is split up in the intestines before absorption is still proceeding.] E. Pflüger⁵ rebuts by new experiments the assertion of L. Hofbauer⁶ that the cause of the difference in their results on the absorption of fat colored with alcanna-red was a difference in the samples of the pigment used. He replies also to a defense of Hofbauer's conclusions, attempted by S. Exner,⁷ and reiterates his dictum that all the fat is absorbed in soluble form (as soaps and fatty acids). In another paper⁸ Pflüger details some new observations which illustrate the manner in which the bile favors the solution of fatty acids and the saponification of fats. E. P. Joslin⁹ has shown that in a case of biliary fistula the administration of bile caused a distinct increase in the absorption of fat as well as of proteids. I. Munk and H. Friedenthal¹⁰ have reinvestigated the question of the possibility and extent of the absorption of fat into the blood after ligation of the thoracic and right lymphatic ducts. On feeding with fat, they always saw a distinct increase in the fat-content of the blood, up to six times the highest

¹ Pflüger's Arch., Bd. LXXXVI, S. 199.

³ Jour. Physiol., vol. XXVI, p. 427.

⁵ Pflüger's Arch., Bd. LXXXV, S. 1.

⁷ *Ibid.*, S. 628.

⁹ Jour. Exper. Med., Mar. 25, 1901.

² YEAR-BOOK, 1900, p. 508.

⁴ Zeit. f. Biol., Bd. XLI, S. 331.

⁶ *Ibid.*, Bd. LXXXIV, S. 619.

⁸ *Ibid.*, Bd. LXXXVI, S. 1.

¹⁰ Centralbl. f. Physiol., Bd. xv, S. 297.

amount present in the blood of fasting animals. Of course, the total absorption of fat from the intestine was much diminished [although still surprisingly great]. It amounted to from 32 % to 48 % of the fat introduced into the alimentary canal. They were unable to confirm the statement of Frank, that after ligation of the thoracic duct only fatty acids are absorbed. They draw the general conclusion that, since the quantity of neutral fat in the blood is increased, and, so far as is known at present, the synthesis of fatty acid to fat does not take place in the blood, but only in the intestinal epithelium, neutral fat can easily pass in large amount through the walls of the capillaries.

Relative Absorption in Large and Small Intestines.—[It is, of course, very well established that absorption of food substances takes place much more readily in the small than in the large intestine.] F. Reach¹ has made a series of comparative experiments which have added something to our knowledge of the relative power of absorption of these two divisions of the gut. While all the nutritive solutions investigated are taken up to a markedly smaller extent from the large than from the small intestine, the difference is not the same for all. Thus, gelatin solution is not so well absorbed in the large intestine as albumose, which, on the other hand, is somewhat less easily absorbed in the small intestine than gelatin. The extraordinary efficiency of the small intestine in digestion and absorption is strikingly illustrated by the observations of J. Erlanger and A. W. Hewlett,² who find that the metabolism of dogs, after removal of from 70 % to 83 % of the combined jejunum and ileum, is not necessarily much affected. On a diet poor in fat the animals absorb as much of the fat as a normal dog, although, as might have been anticipated, a smaller proportion with a diet rich in fat. Such a diet is apt to cause diarrhea. Removal of the large intestine does not hinder the absorption of fat when the small intestine is intact [although there is no doubt that the large intestine can absorb fat, and probably does so to a notable extent after removal of a great part of the small intestine].

Subcutaneous Feeding with Proteids.—E. Laborde³ utters a warning [which seems justified] against the subcutaneous injection of proteids in therapeutics. The increase in the urea excretion following such injections is due, according to him, to the increased destruction of tissue proteids which they induce. Lesions and functional derangements of the kidneys, leading to excretion of albumin in the urine, were always seen in his experiments.

URINE.

Urinary Secretion.—Magnus⁴ and Gottlieb and Magnus⁵ have published a series of important papers on the relation of plethora to diuresis. [In every point their results are unfavorable to the mechan-

¹ Pflüger's Arch., Bd. LXXXVI, S. 247. ² Am. Jour. Physiol., vol. VI, p. 1.

³ Jour. de Physiol. et Path. gén., t. II, p. 700.

⁴ Arch. f. exper. Pathol. u. Pharm., Bd. XLIV, S. 68, 396; Bd. XLV, S. 210.

⁵ *Ibid.*, S. 223, 248.

ical theory of urinary secretion and favorable to the "vital" theory. For instance, the advocates of the mechanical theory have always laid stress on the fact that the hydremic plethora caused by intravenous injection of salts must produce a rise of blood-pressure in the glomeruli, and have thus accounted for the diuresis.] Gottlieb and Magnus find that when the plethora is occasioned by transfusion without altering the composition of the blood, there is no diuresis, although the increase of arterial, capillary, and venous pressure, and the dilation of the kidney are evident. Only when the composition of the blood is altered is there an increase in the flow of urine. Their experiments also contradict the assumption that caffeine diuresis is dependent on a local action of the drug on the caliber of the renal vessels. They therefore support the theory of Schröder, that the point of attack of caffeine is the secreting apparatus of the kidney. Further, they show that there is no regular relation between the blood-pressure and the pressure in the ureter, as the mechanical theory would require. W. H. Thompson¹ finds also that in many cases a small intravenous injection of isotonic NaCl solution causes diuresis out of all proportion to the quantity injected. The excretion of N and urea is generally increased. The diuresis is not due to a rise of blood-pressure; in fact, a fall of pressure is often witnessed during the period of maximum secretion of urine. He has observed, too, that a hydremia does not always produce diuresis. He comes to the conclusion [as every candid critic must, in our opinion] that his results fit in better with Bowman's vital theory than with the mechanical theory of Ludwig. T. Sollmann² also mentions a fact which it does not seem possible to explain on any purely physical hypothesis, viz., that while intravenous injection of isotonic solutions of NaCl is followed by increased excretion not only of NaCl, but also of other salts, the Cl almost disappears from the urine secreted after injection of isotonic solutions of Na₂SO₄. The statement of Schwarz,³ that ligation of the renal vein [contrary to the common belief] always causes an increase in the urinary flow if clotting in it is prevented, might have exercised some influence in rehabilitating the mechanical theory had it not been promptly refuted by D. H. de Souza,⁴ who, on repeating this famous experiment, has obtained only the classic result, viz., a diminution of the secretion of urine. It is true that, as a pupil of Starling, he shrinks from formally renouncing the mechanical hypothesis, but he nevertheless contrives to damn it with the faint and negative praise that "a secretory activity on the part of the cells of the glomerular epithelium is still unproved."

Anesthetics and Urinary Secretion.—W. H. Thompson,⁵ in continuation of his previous work,⁶ reports that ether generally increases, while chloroform generally diminishes, diuresis in dogs. A. C. E. mixture has a variable effect, but there is always a marked after-

¹ Jour. Physiol., vol. XXV, p. 487.

² Arch. f. exper. Path. u. Pharm., Bd. XLVI, S. 1.

³ *Ibid.*, Bd. XLIII, H. 5.

⁵ Brit. Med. Jour., Sept. 22, 1900.

⁴ Jour. Physiol., vol. XXVI, p. 139.

⁶ *Ibid.*, Apr., 1899, p. 793.

increase. A mixture of ether and chloroform constitutes the ideal anesthetic for experiments on the kidney, since it alters the diuresis only slightly. D. Buxton and A. G. Levy¹ have been stimulated to undertake the clinical investigation of the influence of ether anesthesia on the urinary flow, by the statement of Thomson and Kemp² that this drug has a specific, injurious effect on the kidney, complete suppression of the urine frequently occurring. The British authors conclude [and their observations seem to have been carefully conducted] that this "specific ether effect" is not a necessary and initial result of ether narcosis, but the occasional result of prolonged action of ether in a quantity nearly toxic to the bulbar centers. In regard to chloroform they confirm in the main the observations of Thomson and Kemp.

Reflex Anuria.—Starting from the clinical observation of J. Israel, that obstruction of one ureter caused inhibition of the secretion of the other kidney, A. Goetzel³ has investigated in dogs the question whether an experimental increase of intrarenal pressure in one kidney can give rise to reflex anuria of the other. His answer is in the affirmative. It is not, however, the absolute height, but a certain steadiness and permanence of the pressure which is the essential thing.

Bile-acids in Urine.—H. Frenkel and J. Cluzet⁴ and A. Chauffard and F. X. Gourand⁵ have reinvestigated the almost forgotten test of Haycraft for bile in the urine. [Haycraft observed that when bile-salts are present in urine, sulphur, in the form of flowers of sulphur, will not float on the urine, as it will do in the absence of bile. He attributed the difference to an alteration in the surface tension of the urine produced by the bile-salts. The reaction was used at Edinburgh in clinical work, and found to be exceedingly sensitive.] The French authors, while admitting that the test is an excellent one, lay stress on certain precautions which must not be neglected in using it. We must exclude the presence of acetic acid, alcohol, ether, chloroform, turpentine, benzine and its derivatives, phenol and its derivatives, anilin and soaps, all of which also cause such an alteration in the surface tension of urine that sulphur sinks to the bottom. The urine must also be fresh, and if it has to be kept, it must be preserved from decomposition by cyanid of Hg. The reaction is fully as sensitive as any of the more complicated tests, will sometimes detect the presence of bile when other tests fail, and possesses the great advantage of being easily carried out at the bedside. In stomach-contents, vomit, or stools, the test rarely gives good results, because alcohol or acetic acid is very often present in the gastric liquid and phenol and its derivatives in intestinal contents.

Sugar in Normal Urine.—C. Porcher and E. Nicolas⁶ contradict the statement frequently made, that normal dog's urine contains glucose. Crystals resembling those of phenylglucosazone can be obtained by the phenylhydrazin test, but they are not the same. They

¹ *Ibid.*, Sept. 22, 1900.

² N. Y. Med. Jour., 1899, pp. 732, 765, 804.

³ Pflüger's Arch., Bd. LXXXIII, S. 628.

⁴ Jour. de Physiol. et Path. gén., t. III, pp. 99, 153.

⁵ *Ibid.*, p. 461.

⁶ *Ibid.*, pp. 736, 756.

admit [as everybody does] that dog's urine, like human urine, contains substances which reduce cupric salts.

Cryoscopy of Urine.—H. Claude and Balthazard ¹ believe that valuable clinical information can sometimes be obtained by determining the freezing-point of urine in conjunction with estimation of the chlorids.

METABOLISM AND DIETETICS.

The Decomposition of Proteid in Starvation.—[It was first established by C. Voit that in starvation a point is reached, sooner or later according to the condition of the animal as regards fat, at which the decomposition of proteid, after remaining nearly constant or only slowly diminishing from the first days of the starvation period, begins to increase. This increase goes on till shortly before death. Voit explained the increase as due to the disappearance of the body-fat, which normally shields the proteid from combustion.] M. Kaufmann ² has supplied a fresh illustration of the truth of Voit's view, by showing that if N-free food in the form of sugar is supplied to an animal deprived of proteid food, the increase in the proteid decomposition does not take place. The negative result of Schulz ³ he explains [plausibly enough] as the consequence of the poor condition of his rabbits at the beginning of the starvation period. E. Voit ⁴ has worked out in considerable detail the relations between the fat-content of an animal and the rate at which proteid is destroyed in it during starvation. The influence of the body-fat on the magnitude of the proteid decomposition he explains by the dependence of the quantity of circulating fat on the state of replenishment of the stores of fat in the adipose tissue. Death by starvation is not produced by the dying of large masses of cells, but by the disturbance of nutrition in a few organs indispensable to life (brain, heart, etc.), although the actual loss of substance in these is small in comparison with that in less important organs. In another paper ⁵ he announces that Rubner's law, that the total energy required by an animal is proportional to its surface, does not hold for the starving animal, in which, as the body-weight declines, the energy needed does not decrease in proportion to the diminution of surface, but in proportion to the diminution in the quantity of body-proteid.

Uric-acid Formation.—[The old idea that proteid food, as such, is especially a source of uric acid is becoming more and more discredited.] V. O. Sivén ⁶ has found in experiments on himself that the amount of proteid in the food did not affect the quantity of uric acid excreted, unless the extractives of muscle were present, as in a diet containing meat or soup. These extractives [as is well known] cause an increase in the uric-acid excretion. This result agrees perfectly with the observation of J. Müller, ⁷ who states that on

¹ Jour. de Physiol. et Path. gén., t. II, pp. 767, 831, 963.

² Zeit. f. Biol., Bd. XLI, S. 75.

³ Münch. med. Woch., 1899, No. 16, S. 509; Pflüger's Arch., Bd. LXXVI, S. 379.

⁴ Zeit. f. Biol., Bd. XLI, S. 167, 502, 550.

⁵ *Ibid.*, S. 113.

⁶ Skand. Arch., Bd. XI, p. 123.

⁷ Centralbl. f. Physiol., Bd. XIV, S. 641.

an ordinary mixed diet his daily excretion of uric acid was about 1 gram, while it was only 0.38 gram when vegetable proteid, in the form of "Edon," a preparation of cotton seed, was substituted for animal food. According to Sivén, a portion of the uric acid excreted on an ordinary diet comes directly from the purin bases of the meat, while another portion is entirely independent of the food and related to the vital processes of the organism. These conclusions confirm the previously published work of Burian and Schur.¹ As to the source of that portion of the uric acid which is not formed directly from purin bases in the food, Sivén rejects the theory of Horbaczewski, that it comes under normal conditions mainly from the nuclein substances of leukocytes—a theory founded on the unproved assumption that leukocytes break down much faster than other cells. He is inclined to connect the uric-acid production with muscular activity [but brings forward no decisive evidence in favor of this contention, and only suggests it as a possibility]. L. P. Mendel and H. C. Jackson,² who have studied the excretion of uric acid after excision of the spleen, also arrive at the conclusion that at present it is impossible to fix upon any particular organ or group of organs in the mammal, as especially concerned in the formation of uric acid. There is no proof that the spleen or lymph-glands are particularly related to it. The observation of D. Noël Paton,³ that after excision of the spleen no essential change can be noticed in the metabolism of the dog, either when fasting or when fed with proteids, points in the same direction. A discussion on the formation of uric acid by the Section on Physiology at the Ipswich meeting of the British Medical Association⁴ may also be referred to [although it rather illustrates the wide interest which the question is now arousing among physiologists and clinicians than contributes anything of importance to the solution of the problem]. More illuminative is the second paper of Burian and Schur,⁵ who show that in mammals the quantity of uric acid excreted is by no means identical with the sum of the uric acid taken in with the food as purin bases and that produced in the body. A considerable destruction of uric acid goes on in the organism, and mainly in the liver. The quantity excreted by the kidneys, however, bears a certain ratio to the total amount which has entered the circulation. This ratio varies much in different mammalian species. In man a full half is excreted and about a half destroyed; in carnivora, only one-twentieth to one-thirtieth is excreted; in rabbits, about one-sixth.

Glycogenesis.—The ever-interesting question of the mechanism by which glycogen is changed into sugar in the liver is again discussed by M. Bial,⁶ who, after criticizing adversely the experiments of Cavazzani and Paton,⁷ reiterates the view that the simplest and least forced hypothesis is that glycogen is transformed into sugar, both in the living animal and the "surviving" liver, by a diastatic ferment present in the

¹ Pflüger's Arch., Bd. LXXX, S. 241.

² Am. Jour. Physiol., vol. IV, p. 163.

³ Jour. Physiol., vol. XXV, p. 443.

⁴ Brit. Med. Jour., Sept. 15, 1900.

⁵ Pflüger's Arch., Bd. LXXXVII, S. 239.

⁶ Arch. f. (Anat. u.) Physiol., 1901, S. 249.

⁷ YEAR-BOOK, 1898, p. 982.

blood and lymph. On the other hand, J. Seegen ¹ argues in favor of the theory that the sugar production in the liver is associated with the vital activity of the hepatic cells. He finds additional support for this in the observation that in slowly produced asphyxia (as by CO poisoning in man and gradual occlusion of the tracheal cannula in animals) the glycogen practically disappears from the liver, while in dogs killed in the ordinary way it is present in considerable amount, even 24 to 48 hours after death. [We see in these results no reason for altering the opinion expressed in previous reports, that while the *intra vitam* change of hepatic glycogen into glucose and the change which takes place in an excised, surviving liver are both related to the vital activity of the hepatic cells, diastatic ferments, undoubtedly present in the dead liver, must be supposed capable of acting on the glycogen too.]

Diabetic Coma.—Magnus-Levy ² has supplemented his valuable research ³ on acid-poisoning as the cause of diabetic coma by an investigation of the urine in a new case in which the condition was relieved by NaHCO₃. Formic, butyric, and probably acetic acids were found in the urine, as well as oxybutyric and acetoacetic, but only the last two are quantitatively important. As to the source of the oxybutyric acid, he concludes that it cannot come solely and directly from the proteids or carbohydrates, but may come from fat, although he admits, with Geelmuyden, ⁴ that the mode of formation of the acetone bodies is still doubtful. [In connection with the whole subject of acid-poisoning, it should not be forgotten that while the diminished capacity of the blood to transport CO₂ must be considered a factor in the production of toxic phenomena, it is not necessarily the sole factor.] Thus, A. Loewy and E. Münzer ⁵ maintain that, although in rabbits the administration of acids, like HCl, or substances which form acids, like P, causes a moderate diminution in the alkalinity of the blood and a marked diminution in its power of taking up CO₂, the death of the animal cannot be explained in this way, but must be due to a specific deleterious influence exerted on the cells of the body. The incompleteness of our knowledge of the fundamental metabolic changes in diabetes is emphasized anew by the observation of A. Mossé, ⁶ who states that [contrary to orthodox opinion and practice] the giving of potatoes in sufficient quantity to replace bread entirely in the diet of diabetics is followed by a notable diminution of the glycosuria and diuresis, and an amelioration of the general condition. He shows ⁷ that this result is not connected with any defect in the absorption of the carbohydrates, nor with insufficient transformation of them by the digestive juices.

Nutritive Value of Alcohol.—[In our last report it was said, in

¹ Centralbl. f. Physiol., Bd. XV, S. 65.

² Arch. f. exper. Path. u. Pharm., Bd. XLV, S. 389.

³ *Ibid.*, Bd. XLII, S. 149; YEAR-BOOK, 1900, p. 512.

⁴ Skand. Arch., Bd. XI, S. 97; Zeit. f. physiol. Chem., Bd. XXIII, S. 431.

⁵ Arch. f. Physiol., 1901, S. 81; Verhandl. d. Berlin. physiol. Gesell., *ibid.*, S. 174.

⁶ Bull. gén. de Therap., Jan., 1900; Compt. rend., Thirteenth Internat. Med. Cong., Paris, 1900.

⁷ Jour. de Physiol. et Path. gén., t. III, p. 792; Soc. de Biol., May, 1901.

summing up the present condition of this question, that while there was a general agreement that alcohol "sparer" fats and carbohydrates, there was still diversity of opinion as to its proteid-sparing power.] R. Rosemann,¹ who previously denied that it had any such power, has published what is practically a monograph on the subject, containing a critical account of all the important work, with fresh experiments of his own, and now arrives at the conclusion that although alcohol does really spare the proteids by its combustion, this action is, in the first days of an experiment, masked by an injurious effect of the unburnt alcohol on the cells, which causes an increase in the rate of their proteid decomposition. Later on, this injurious action ceases, and the proteid-sparing power of the alcohol is fully revealed. A similar result is reported by A. Clopatt.² But while alcohol is thus formally admitted to the list of food-substances, Rosemann doubts the advisability of giving it to the sick for its nutritive value. [This, of course, leaves the question of its value as a drug untouched.]

Substitutes for Butter.—[In these days of artificial foods it is important to have exact information as to the comparative digestibility and capacity for absorption of such products and the natural food-substances which they replace.] H. Wibbens and H. E. Huizenga³ have compared "Sana," a substitute for butter, said to be absolutely free from milk constituents, with cows' butter and with ordinary margarine. They find little, if any, difference between them.

Sugar as an Article of Diet.—On the other hand, G. von Bunge⁴ enters a protest against replacing the natural food mixtures by chemie individuals so long as our ignorance of the laws of nutrition is still so great. For example, he sees in the replacement of vegetables rich in carbohydrates by sugar a danger of deficiency in the supply of Ca and Fe. Honey has the advantage over sugar that its content of Fe is nearly equal to that of white bread, while it also contains a small amount of proteids. [From the physiologic standpoint the recommendation to use honey is no doubt admirable, but we fear that until some kind of mechanical bee has been invented, the toiling millions of the great cities will not get much benefit from it. In the mean time, molasses, maple syrup, and maple sugar might well be more largely used in this country.]

Animal and Vegetable Proteids.—It may comfort the vegetarians to know that, according to the exact experiments of H. Lichtenfelt,⁵ the proportion between intake and excretion is the same for proteids of vegetable as for proteids of animal origin; the former are used up at the same rate as the latter.

Training.—The same observer,⁶ after a careful study of the phenomena of "training," concludes that continuous bodily work at a rate above the ordinary requires a large amount of proteid (2 to 3 grams a day per kilo of body-weight). In this result he finds support for

¹ Pflüger's Arch., Bd. LXXXVI, S. 307.

³ Pflüger's Arch., Bd. LXXXIII, S. 609.

⁵ Pflüger's Arch., Bd. LXXXVI, S. 185.

² Skand. Arch., Bd. XI, S. 354.

⁴ Zeit. f. Biol., Bd. XLI, S. 155.

⁶ *Ibid.*, S. 177.

Pflüger's dictum that "increased decomposition of proteid is associated with increased vitality, which in the struggle for existence determines the victory." However this may be, there is no doubt that N equilibrium may be maintained, at least for a short time, on a diet containing a surprisingly small proportion of proteid. Thus, V. O. Sivé¹ has confirmed, by further observations on himself, his previous statement² that the human organism can keep itself in N equilibrium with an intake of 0.07 to 0.08 gram N per kilo of body-weight. Albu³ has also published observations on an old woman, who, living as a strict vegetarian for 6 years, was in N equilibrium with a quantity of N no greater than Sivé's. There seems, however, to be a considerable difference between different individuals, for W. Caspari⁴ could not come into N equilibrium even with a markedly greater amount of N. [The condition of the body at the beginning of the experiment—whether it is well nourished or emaciated—no doubt has something to do with the results.]

Source of the Energy of Muscular Contraction.—A series of valuable papers on metabolism during muscular work have in the past year proceeded from Zuntz's laboratory, which has already contributed so much to our knowledge on this important topic. These include researches by H. N. Heinemann,⁵ J. Frentzel and F. Reach,⁶ K. Bornstein,⁷ W. Caspari,⁸ A. Loewy and F. Müller,⁹ N. Zuntz,¹⁰ and Zuntz and Schumburg.¹¹ Heinemann offers new and convincing evidence of the inaccuracy of the hypothesis of Chauveau, that fat is changed into carbohydrate before it is used up in muscular activity. If it were true, 29% more energy must have been used up in doing a certain amount of work on a diet of fat than when the muscles were supplied with a sufficiency of carbohydrate. So far was this from being the case, that less energy seemed to be required on the fatty than on the carbohydrate diet. For such accustomed work, however, as walking, Frentzel and Caspari found practically no difference in the economy of fat and carbohydrate.

INTERNAL SECRETION.

Suprarenal Capsules.—[The controversy as to the nature of the body in suprarenal extracts which causes the rise of blood-pressure continues.] J. J. Abel¹² states that von Fürth's so-called "suprarenin" is only a modification of his epinephrin. R. Hunt¹³ finds that the sulphate of epinephrin is many times more powerful than the aqueous extracts of suprarenal which Moore and Purinton¹⁴ declared to be active in such exceedingly small doses that it was impossible to attribute their properties to the presence of epinephrin or suprarenin. Takamine¹⁵ has isolated, in crystalline form, by a new method, a body

¹ Skand. Arch., Bd. XI, S. 308.

² *Ibid.*, S. 91; YEAR-BOOK, 1901, p. 554.

³ Deut. Med.-Zeit., 1901, XXII, No. 17.

⁴ Arch. f. (Anat. u.) Physiol., 1901, S. 323.

⁵ Pflüger's Arch., Bd. LXXXIII, S. 441.

⁶ *Ibid.*, S. 477.

⁷ *Ibid.*, S. 540.

⁸ *Ibid.*, S. 509.

⁹ Arch. f. (Anat. u.) Physiol., 1901, S. 299.

¹⁰ Pflüger's Arch., Bd. LXXXIII, S. 557.

¹¹ Physiol. des Marsehes, Berlin, 1901.

¹² Proc. Am. Physiol. Soc., Am. Jour. Physiol., vol. v, p. v.

¹³ *Ibid.*, p. vii.

¹⁴ YEAR-BOOK, 1901, p. 558.

¹⁵ Therap. Gaz., 1901, p. 221.

to which he gives the name "adrenalin," and which is so extraordinarily active that 0.000001 gram per kilo of body-weight, injected intravenously, causes a rise of 14 mm. Hg in the blood-pressure. T. B. Aldrich¹ has obtained independently a substance which he believes to be identical with adrenalin. If we subtract a benzoyl residue from Abel's formula for epinephrin, we obtain a formula not very different from that of adrenalin. [It is obvious that more light is required on this subject.] That the suprarenals actually contain and give off to the blood during life a substance which is capable of raising the blood-pressure is shown by the observations of H. Strehl and O. Weiss,² who state that in animals previously deprived of one suprarenal extirpation of the other causes a marked fall of pressure. A similar fall is produced by merely dividing or clamping the veins of the gland. It is difficult to harmonize with this the assertion of I. Levin³ that the blood of an animal deprived of its suprarenals increases the blood-pressure of a normal animal into whose veins it is injected. [We would feel greater confidence in accepting this somewhat puzzling result were it not that Levin also found that the blood of a normal animal (presumably defibrinated), when injected into a normal animal, produced no effect on the blood-pressure. Now, T. G. Brodie⁴ has shown that normal defibrinated blood or serum, when injected intravenously, causes a fall of blood-pressure due to inhibition of the heart and vasodilation.] [The striking action of suprarenal extract on the blood-pressure has tended to divert attention from its other effects.] J. N. Langley⁵ has investigated these in his usual thorough manner. Among other actions he has observed inhibition of the stomach (especially its sphincter), the intestine, and the urinary and gall-bladders; contraction of the uterus, vas deferens, and seminal vesicles; dilation of the pupil; stimulation of the salivary and lacrimal secretions. He makes the generalization that the effects produced by suprarenal extract are all such as are caused by stimulation of sympathetic nerves, and not such as are produced by stimulation of cranial or sacral autonomic fibers. The difference does not appear to depend on a difference of susceptibility to the action of the extract in the nerves themselves or their endings, but rather on a difference in the muscular fibers.

Thyroid.—R. H. Cunningham⁶ states that the purified colloid obtained from the thyroid is much better than the tablets of dried thyroid extract for therapeutic purposes, because it does not give rise to toxic symptoms, as large doses of the tablets do, and it is also more effective in curing myxedema. Iodothyrim does not seem to be nearly so active as the colloid, from which it can be readily prepared. E. von Cyon and A. Oswald⁷ have investigated the question whether the antagonism shown by Cyon to exist in the action of iodothyrim and inorganic iodine salts on the cardiac and vasomotor nervous mechanism also exists

¹ Am. Jour. Physiol., vol. v, p. 457.

² Pflüger's Arch., Bd. LXXXVI, S. 107.

³ Proc. Am. Physiol. Soc., Am. Jour. Physiol., vol. v, pp. ix, 358.

⁴ Jour. Physiol., vol. XXVI, p. 48.

⁵ *Ibid.*, vol. XXVII, p. 237.

⁶ Med. News, July 21, 1900.

⁷ Pflüger's Arch., Bd. LXXXIII, S. 199.

for iodine salts and thyroglobulin, a globulin which, according to Oswald,¹ contains iodothyron in its molecule, and is the true active substance of the thyroid. They find that none of the other bodies which can be separated from the thyroid, even when they contain iodine, possesses the physiologic properties demonstrated for iodothyron. [The comparative ease with which the thyroid can be grafted has been illustrated in numerous experiments by H. Cristiani.² He has obtained successful grafts in all the mammals investigated—viz., cat, dog, fox, polecat, rabbit, guinea-pig, weasel, and rat. In striking contrast to this result is the failure of all attempts, including the latest by H. Strehl and O. Weiss,³ to transplant the suprarenal.]

Pituitary.—[In our last report we criticized Cyon's view that the effect of increase of blood-pressure on the vagus center is an indirect one due to excitation of the hypophysis.] A. Biedl and M. Reiner⁴ reiterate their previous assertion that, contrary to Cyon's statement, a rise of blood-pressure, produced either by compression of the aorta or by injection of suprarenal extract, causes slowing of the heart through the vagus center when that center has been separated from both the spinal cord and the brain, including the hypophysis, and even after destruction of the latter. E. A. Schäfer and R. Magnus⁵ report that watery extracts of the infundibular or nervous portion of the pituitary produce a rise of blood-pressure by contracting the systemic arterioles, much in the same way as suprarenal extract does. But while suprarenal extract causes a marked diminution of the volume of the kidney and complete cessation of the flow of urine, pituitary extract generally causes a long-continued expansion of the kidney accompanied by diuresis.

Testicle.—W. E. Dixon⁶ has made a detailed investigation of the effects of injection of the proteids and other constituents of orchitic extracts made with normal saline solution. The nucleoprotein, the most plentiful of the protein substances, is the only one which causes any pronounced action. The blood-pressure falls, mainly owing to inhibition of the heart, but partly to vasodilation in the splanchnic area. Large doses produce also inhibition of respiration.

Nervous Tissues.—W. D. Halliburton⁷ is unable to confirm the statement of Osborne and Vincent⁸ that atropine does not abolish the depressant effect of the injection of extracts of nervous tissue. He still maintains that the body which causes the fall of blood-pressure is choline. He points out that all observers are agreed that choline is present in such extracts; the only question is whether there is enough to account for the fall of pressure. In the absence of any accurate method of estimating choline in organic mixtures, he says, this cannot be decided, and he therefore concludes that he is entitled to his view that sufficient is pres-

¹ YEAR-BOOK, 1901, pp. 132, 133, 538.

² Jour. de Physiol. et Path. gén. t. III, pp. 22, 200.

³ Pflüger's Arch., Bd. LXXXVI, S. 107.

⁴ *Ibid.*, Bd. LXXXIII, S. 152.

⁵ Proc. Physiol. Soc., Jour. Physiol., vol. XXVII, p. ix.

⁶ Jour. Physiol., vol. XXVI, p. 244; Practitioner, May, 1901; Brit. Med. Jour., Mar. 23, 1901.

⁷ Jour. Physiol., vol. XXVI, p. 229.

⁸ YEAR-BOOK, 1901, p. 558.

ent. [We should have thought the logical conclusion to be that nobody is entitled at present to any positive opinion on the subject.]

NERVOUS SYSTEM.

Nerve-cells.—Langley and Dickinson showed some time ago that nicotin first stimulates and then paralyzes sympathetic ganglia. Langley¹ now discusses the question whether the point of attack of the drug is the ganglion-cells or, as Cushny and Huber² have suggested, the preganglionic nerve-endings. He proves that it is the ganglion-cells themselves which are stimulated by the nicotin, since the stimulating effect is still obtained after degeneration of the preganglionic fibers. But he is unable at present to produce decisive evidence that nicotin also paralyzes the cells. As a token of the physiologic differences that may exist between different kinds of nerve-cells, he cites the fact that nicotin has no appreciable stimulating action on the spinal ganglia. On the other hand, it strongly excites both the bulbar and spinal motor nerve-cells (in the skate). W. B. Warrington³ has continued his observations on the structural alterations in the nerve-cells of the spinal cord after lesions of their processes. Schäfer⁴ has already pointed out that in the monkey, after section of the dorsal and ventral cerebellar tracts, chromatolysis of the cells of Clarke's column takes place. Warrington finds that this is the case in the dog and cat also. After division of the cord between the seventh and eighth cervical roots, the cells of Clarke's column almost disappeared. The cells of the anterior horn, on the contrary, remained normal, which shows that mere disuse is incapable of producing any structural alteration. F. C. Eve,⁵ in an interesting investigation of the influence of temperature on the cells of the superior cervical ganglion, shows that there are definite limits of temperature above and below which the ganglion-cells are paralyzed and no longer permit the passage of nerve-impulses. The upper limit (in the cat and rabbit) is about 50° C. If this temperature is not too long maintained, the ganglion will recover on cooling. C. A. Pugnet⁶ has studied by Nissl's method the histologic changes produced by extreme fatigue in the nerve-cells of the central nervous system of dogs. The animals were obliged to run from 64 to 93 kilometers in a special apparatus. The phenomenon most generally observed was chromatolysis, varying greatly in degree in different cells, from mere diminution of the chromatophile substance to complete disappearance of it, and such disintegration of the cell as must have precluded its recovery had the animal been allowed to live. The nucleus also showed changes, but the nucleolus was comparatively resistant. Many, and indeed most, of the cortical cells were quite unaffected. R. S. Woodworth,⁷ after discussing the methods which may be used to discriminate between fatigue of

¹ Jour. Physiol., vol. XXVII, p. 224.

² Jour. Comp. Neurol., vol. VII, p. 122, 1897.

³ Jour. Physiol., vol. XXV, p. 462.

⁴ YEAR-BOOK, 1901, p. 516.

⁵ Jour. Physiol., vol. XXVI, p. 119.

⁶ Jour. de Physiol. et Path. gén., t. III, p. 183.

⁷ Proc. Am. Physiol. Soc., Am. Jour. Physiol., vol. V, p. iv.

the central nervous organs and fatigue of muscles, concludes that no real proof has been given that nerve-cells undergo fatigue sooner than the peripheral portions of the neuromuscular mechanism.

Action of Drugs on Neurons.—H. Wright¹ states that the inhalation of ether or chloroform (in the dog) so alters the chromatic substance of the nerve-cells that it loses its affinity for anilin dyes. In long-continued anesthesia the nucleus is also affected, while the nucleolus is the last part of the cell to suffer. A greater alteration occurs in the cells in the 3 hours between the sixth and ninth hours of anesthesia than in the 5 hours between the first and sixth. The changes are transitory. After a narcosis of 9 hours the cells are practically normal in 48 hours. From these histologic results, coupled with the physiologic observation that after a certain duration of the anesthesia (6 hours in the dog) the conjunctival reflex only slowly returns, he draws the practical deduction that there is a limit to the time of safe anesthesia. A. Kleefeld² has studied the histologic changes which Berkley and others have shown to be produced in neurons by alcohol. The moniliform condition appears first and is most pronounced in the dendrites. Later on it may also be observed in the axones, although it is never so well developed here. The cell-body does not appear to be histologically modified under the influence of alcohol.

Cerebral Cortex.—E. Hitzig,³ in dealing with the present position of the doctrine of cortical motor centers, discusses, among other topics, the question whether the "motor" region is also sensory, and [in opposition to Schäfer and Ferrier] comes to the conclusion that it is [a conclusion which seems fully justified by the evidence]. Such observations as those of Simpson,⁴ who found that after unilateral lesions of the motor cortex (in cats and monkeys) the distribution and degree of the sensory paralysis were not in all cases the same as the distribution and degree of the motor paralysis, are not incompatible with the view that the Rolandic cortex is sensori-motor. J. H. Parsons,⁵ working mainly with cats, has confirmed the statement of G. N. Stewart⁶ that stimulation of the region around the crucial sulcus (in dogs), especially at the outer end of the sulcus and immediately in front of this, causes dilation of the pupil in both eyes, but best marked in the opposite eye, even after division of both vagosympathetics in the neck. Parsons shows that the effect is not obtained if the third nerve is divided as well as the sympathetic, and therefore concludes [no doubt correctly] that it is most probably produced by an inhibition of the tonic influence of the third nerve on the sphincter muscle of the iris. C. S. Sherrington⁷ has remarked that in the dog, after section of the spinal cord and the vagi, the emotion of anger still causes dilation of the pupil. [The author of this

¹ Jour. Physiol., vol. XXVI, pp. 30, 362.

² Jour. de Physiol. et Path. gén., t. III, p. 563.

³ Hughlings-Jackson Lect., Brit. Med. Jour., Dec. 1, 1900.

⁴ Jour. Physiol., vol. XXVII, p. x.

⁵ *Ibid.*, vol. XXVI, p. 366; Proc. Physiol. Soc., *ibid.*, p. lviii.

⁶ Manual of Physiol., third ed., 1898, pp. 731, 753; *ibid.*, fourth ed., 1900, pp. 770, 792.

⁷ Nature, vol. LXII, p. 330, 1900.

abstract has observed marked dilation of the pupil in dogs (of both sexes) during sexual excitement, after division of the vagosympathetic. The amount of dilation thus produced is greater than can be obtained by artificial stimulation of the cortex after vagal section.]

Cerebral Anemia.—L. Hill¹ states that nearly all dogs recover after ligation in one operation of both carotids and both vertebral arteries. The only effect is temporary dementia accompanied by anesthesia and paresis. In monkeys both carotids may, as a rule, be safely tied. If in addition one of the vertebrals be ligated at the same time, sopor results, and this is generally followed by extensor rigidity, coma, and death in 24 hours. In one case a monkey survived this triple ligation, but became demented. The motor paralysis and rigidity were much greater than in the dog. In the condition of partial anemia the cortex is more excitable than normal, but the excitability disappears at once when the anemia is rendered complete. His experiments confirm the view that motor paralysis produced by removal of the "motor" area is not due to the loss of an autonomous center of volition, but to the interruption of the sensory impulses which stream toward the motor region along the afferent and association pathways of the cerebrum. These observations also lend weight to the opinion that the "anemia theory" of sleep is inadequate [an opinion which, in our belief, is not invalidated by the observations of Brush and Fayerweather² on the changes of arterial pressure in sleep]. Mott³ has dealt with the histologic side of Hill's research. Halliburton⁴ discusses the present state of our knowledge of the chemic side of nervous activity [and, through no fault of his, throws just enough light on it to render the darkness visible]. Other papers within the limits of our space permit us merely to mention, but which will repay perusal, are those by W. B. Cannon,⁵ on the causation of the increase of cerebral pressure which often follows traumatic injuries of the brain; by A. Spina,⁶ on the absorption of the cerebrospinal fluid with normal and increased intracranial pressure; by M. Lewandowsky,⁷ on the functions of the cerebellum; and by M. Rothmann,⁸ on the functional significance of the pyramidal paths.

MISCELLANEOUS.

J. Loeb,⁹ continuing his brilliant studies on the effects of ions on contractile structures, has discovered that certain salt solutions produce an apparently new form of muscular irritability, which he provisionally names "contact irritability," and which is characterized by the fact that a muscle treated with these solutions will contract powerfully when it passes from the salt solutions to air, oil, sugar solutions, etc. One of Loeb's pupils, R. Lillie,¹⁰ has extended Loeb's discovery of the injurious

¹ Phil. Tr. Roy. Soc. B., vol. CXIII, p. 69.

² Croonian Lects., 1900.

³ Am. Jour. of Physiol., vol. VI, p. 91.

⁴ Pflüger's Arch., Bd. LXXXIII, S. 120, 415.

⁵ Centralbl. f. Physiol., Bd. XV, S. 225.

⁶ Am. Jour. Physiol., vol. V, p. 362.

⁷ Am. Jour. Physiol., vol. V, p. 199.

⁸ *Ibid.*, 1901; Lancet, June 15, 1901.

⁹ Berlin. klin. Woch., May 27, 1901.

¹⁰ *Ibid.*, p. 56.

action of pure NaCl solutions on muscle to cilia, which he finds to be rapidly paralyzed by such solutions. As in the case of muscle, CaCl_2 or MgCl_2 prevents the injurious action of Na ions, the former having the most favorable effect on muscle, the latter on cilia. Among the many other interesting papers which we should have liked to do justice to are those of J. Lefèvre,¹ M. Blix,² and E. T. Reichert,³ on animal heat, and of A. P. Mathews⁴ and S. J. Hunter,⁵ who have followed up Loeb's⁶ observations on artificial parthenogenesis.

¹ Jour. de Physiol. et Path. gén., t. III, pp. 1, 523.

² Skand. Arch., Bd. XII, S. 52.

³ Am. Jour. Physiol., vol. IV, p. 397.

⁴ *Ibid.*, vol. VI, p. 142.

⁵ *Ibid.*, p. 177.

⁶ YEAR-BOOK, 1900, p. 518.

LEGAL MEDICINE.

By WYATT JOHNSTON, M.D.,

OF MONTREAL, CANADA.

Epitome.—The most important medicolegal discovery made during the year was undoubtedly the new test for recognizing the origin of blood stains, announced almost simultaneously by Uhlenhuth and by Wassermann and Schutze. Apart from this, no single very striking advance has been made, though satisfactory progress has been made along the various lines. It is regrettable that the numerous efforts made at improving the status of the medicolegal expert have not yet shown any very obvious results. It is a question whether the nomination of experts, the only tangible remedy proposed, will ever, if accomplished, effectually settle the difficulty. Meanwhile the discussion of this somewhat barren theme continues almost to monopolize the attention of American medicolegal writers.

DEATH AND THE DEAD BODY.

A unique case of **fat-embolism** in a tuberculous man following rupture of the liver was observed by H. Engel.¹ The patient twisted his body sharply in saving himself from a fall. He went home without complaining and next afternoon died with edema of the lung. The autopsy showed a rupture of the liver on the upper convexity, 10 centimeters long and 1 centimeter deep. The liver was fatty, except in cells in the immediate vicinity of the injury. The one lung available for breathing showed well-marked fat-embolism.

Much attention is now being given to the connection of **trauma and infection**. A fatal case of purulent **traumatic meningitis without external wound** is recorded by List² in a boy aged 16, who fell on his back. As there was a pustule on the hand and *Staphylococcus aureus* was found in the cerebrospinal fluid, the author considers the condition metastatic. Wedekind³ reports a case of fatal peritonitis after contusion, without recognizable lesion of organs.

Ehrenwith⁴ experimented on 100 rabbits, finding that 13% suffered from **brain lesion** [meningitis?] when infected with bacteria by intravenous injection, whereas 75% were similarly affected when at the same time concussions of the head were inflicted.

¹ Münch. med. Woch., 26, 1901.

³ Aertz. Sachv. Ztg., 14, 1901.

² Thesis, Tiel, 1900.

⁴ Rev. Neurol., Aug. 30, 1900.

Forensic Significance of Suppuration Due to Chemic Irritants.

—Mayer ¹ has studied the results of the external application of caustic and corrosive remedies in the hands of quacks, and finds that while occasionally they have beneficial effects, the danger is so great as to necessitate their use by such persons being strongly repressed, and it is to be regarded as a treatment requiring great caution even in skilled hands.

Of the rarer causes of sudden death, H. Metcalf ² records a death from **rupture of caseous gland into the larynx**.

F. Batelli ³ has studied the mechanism of deaths by **electric currents**, and found that death could occur with currents of 115 volts, by inhibition of the heart's action.

Death from Starvation.—Frei ⁴ examined the body of a child stated to have died suddenly in full health. Crime was suspected in this case. The child was much emaciated and showed a completely empty state of the alimentary canal. It was officially decided to be a case of starvation, whereupon the mother confessed that such was really the case.

Sudden Death in Infancy.—M. Thiemich ⁵ finds that this affects chiefly children well nourished and overfed by artificial means, and considers that in this class of cases, even with no obvious lesions, it is usually safe to conclude that death has been due to natural causes.

Attempted Mutilation of Newborn Child.—O. Moebius ⁶ examined a body on which over 50 wounds were inflicted with a sharp skewer, apparently with the object of cutting up the body. The wounds were the cause of death.

Pitoiset ⁷ has treated comprehensively the subject of the **mutilation of corpses** for criminal purposes.

Felletar ⁸ reports an instance of **necrophilia of a female corpse**. The grave of a young woman of 21, dead of tuberculosis, was found opened, the coffin broken open, and the corpse dragged out with thighs separated. Seminal stains were found on pubis and clothing, and semen in the vagina.

Postmortem Digestion.—C. Ferrai ⁹ has made an experimental investigation as to the length of time after death during which digestion continued in the case of dogs. The extent depended mainly on the period of digestion at which death occurred, and on the temperature of the body. The exact mode of death exercised little influence. Digestion of albumin continued for a mean period of 7 to 8 hours, lengthened when a postmortem rise of temperature occurred. The intensity was greatest with external temperature of 28° to 30° C. At this point digestion will accomplish as much in 10 hours as occurs in 1 hour in a living animal. The extent of the process is in inverse ratio to the amount of the contained food.

¹ Viertelj. ger. Med., Jan., 1901.

² Lancet, May 25, 1901.

³ Ann. d. Electrobiol., Jan., 1900.

⁴ Correspondenzbl. f. Schweiz. Aerzte, 23, 1900.

⁵ Viertelj. ger. Med., Apr., 1901.

⁶ Zeit. f. med. Beamte, 81, 1901.

⁷ Thesis, Paris, 1901.

⁸ Ungarische med. Presse, 2, 1900.

⁹ Viertelj. ger. Med., Apr., 1901.

G. Stubenrath¹ records the result of experimental studies upon **adipocere** formation. The author was able experimentally to produce adipocere in fatty tissues while the adjacent muscular or fleshy parts became dissolved by putrefaction.

WOUNDS AND INJURIES.

Gumperz² concludes as follows as to the recognition of the **causation of head injuries**: The shape of a blunt instrument can be occasionally deduced from the nature of the contusion, and blunt-angled objects by the crushing of the skin. In very severe shocks by blunt instruments no skin wound exists, as a rule. Bites can usually be identified by tooth-marks, but those of the canine teeth of dogs resemble stab-wounds. Stabs with angular instruments give stellate wounds. In slit-like wounds the diagnosis between conical one-edged or two-edged weapons cannot be made.

Stab-wounds of the spinal cord, in their medicolegal relations, are dealt with by P. Roeseler³ in a valuable analysis of 46 collected cases, partly personal.

R. Glitsch⁴ discusses the medicolegal aspects of **wounds of the stomach**, and reaches the following conclusions: Stab-wounds within the topographic limits of the stomach region probably involve it, and shot-wounds almost certainly do so. Death is very rarely immediate, and the signs of vital reaction are almost always recognizable. Suicidal stomach wounds are very rare. Vomiting of blood, collapse, and shock are not constant results of perforating wounds of the stomach. These may pass without symptoms, but usually become alarming sooner or later. The results depend largely on the condition as to fullness, the injury of large vessels, and the association of injury of other organs. Prognosis is only good if promptly treated by laparotomy, and medicolegally it is to be regarded as a mortal wound, in spite of occasional cases of spontaneous healing. Subcutaneous perforations have usually the most severe immediate symptoms, and subcutaneous rupture is to be regarded as fatal. The case of the late President McKinley is an instance of the great danger involved in wounds affecting the pancreas. The full details of the case were given in the official report of his medical attendants, through the leading American papers of the date of October 19, 1901.

Mally,⁵ in discussing **electric burns**, lays stress on the dry condition of the wounds and the absence of secretion, as well as on the fact that the ulcers are often painless during the entire course of the case, even at the onset. The burned areas are circumscribed as if bored out with a punch. A paresis of the adjacent muscular groups may occur without alteration in their electric reactions.

Alleged Lead-poisoning from a Burn.—Bettmann⁶ reports the

¹ Wien. med. Woch., Oct. 27, 1900.

² Friedreich Bl., Dec., 1900, and Jan., 1901.

³ Allg. med. Cent.-Ztg., 33-37, 1901.

⁴ Mon. Unfallheilk., 7, 1901.

⁵ Dent. med. Ztg., 72, 79, 1900.

⁶ Rev. de Chir., 3, 1900.

case of a type-founder who received a severe burn of the arm from lead-containing molten metal. Following this he had a severe attack of lead-poisoning of gouty type, followed by palsy. He is stated to have had a lead line of the gums prior to the accident. [The author's assumption that the absorption of lead occurred at the time of contact with the molten metal appears quite gratuitous.]

Fench and Pramm¹ report a **wound of the heart** without visible traces of bleeding.

Thevenot and Patel² report a case of **vitriol corrosion of the mons veneris**, followed by gangrene of the skin and extensive sloughing, entirely confined to the surface.

A Study of Self-inflicted Traumatism.—Fallot³ publishes a case recently tried at Marseilles (1899), in which a gang of swindlers employed a special form of forceps, fitted with iron teeth arranged so as to resemble a horse's teeth. The wounds were inflicted in this manner under circumstances which enabled them to be ascribed to the bites of horses, and suits were (in some cases successfully) taken against the owners through the evidence of accomplices.

Simulated Strangulation.—P. de la Touche⁴ reports a case in which there were traces of superficial scratches on the neck without ecchymoses, aphonia, or difficulty of deglutition. The absence of these phenomena led the author to doubt the genuineness of the case, his suspicions being borne out by the result of the judicial inquiry.

DISABILITY AND DISEASE FOLLOWING INJURY.

[The literature on this subject during the year, though abundant, brings little that is novel.]

Landau⁵ lays down the principles to be followed in estimating the **duration of disability in internal diseases**. Patients are obviously unfit to work during acute fever and at least a week following unless only very slightly ill. In nonfebrile disease work can be recommenced earlier. In some chronic diseases the patients can work in the intervals, but it must be remembered that the system is weakened. Those working at home resume their duties more readily.

Jeremias⁶ compared the relative loss of earning power in 25 cases of **traumatic neurosis** and in 10 of nontraumatic neurosis. The earning capacity at the onset was *nil* in 56% of the traumatic cases, below two-thirds in 36%, and over two-thirds in 8%. In the non-traumatic cases, at the onset the earning power was *nil* in 20%, below two-thirds in 75%, and over two-thirds in 5%. After an interval of a year in the same cases, there was still found to be over two-thirds of disablement in 40% of the traumatic and 20% of the nontraumatic cases.

¹ Ann. d'Hyg. Pub., 1901.

² Ann. d'Hyg. Pub., June, 1901.

³ Münch. med. Woch., 17, 1901.

⁴ Arch. d'Anthrop. Crim., Mar., 1901.

⁵ Ann. d'Hyg. Pub., Feb., 1901.

⁶ Mon. Unfallheilk., 12, 1900.

Neuberger,¹ in an article on **disability from skin diseases**, emphasizes the necessity of the physician being careful as to the importance attached to subjective symptoms, and the fact that many skin diseases can be treated without leaving off work.

Diabetes and Accident.—An important discussion was held by the Berlin Society of Internal Medicine,² upon the relation of the two conditions. Although no novel conclusions were advanced, it is evident that greater stringency is to be recommended in admitting the proof of this symptom being due to an injury.

Spitzer³ reports a case of **fatal diabetic coma after trauma** following upon fracture of the clavicle. The urine had been free from sugar before the injury.

Myxedema from Injury.—Bornträger⁴ reports a [doubtful] case. The patient had suffered from myxedema after removal of thymus. This improved, but later on, when he had a felon of the thumb, it became much worse. It was considered that the lowering of vitality had led to the recurrence [a view hardly tenable in view of the difficulty of effecting permanent relief in this condition].

J. Bornträger⁵ also records a case of **pseudoleukemia** after injury. The injury was the falling of a sack of meal on the shoulders, forcing chest together and causing a stitch in the side. Previously there had been good health. From this time on the patient became more and more ill, and 6 weeks after the injury had well-marked lymphatic pseudoleukemia. Death occurred within 8 weeks from the time of the accident.

Syphiloma was regarded by M. Schmidt⁶ as the result of accident in the case of a man of 32, who received a blow in the back, over which a swelling formed larger than a fist. On excision it had the appearance of a tuberculous fungating granuloma. It was twice extirpated, but recurred. After antisiphilitic treatment it remained permanently healed.

Kissinger⁷ discusses in an address the views regarding traumatic influences on **articular rheumatism** and its pyrogenic origin.

Gonorrheal Arthritis and Trauma.—Ball⁸ reports the case of a workman who on the fifth day of an acute attack of gonorrhea fell heavily on his right knee while carrying a weight. A severe synovitis ensued, which ran the course of gonorrheal arthritis, leaving a stiff joint. [No bacteriologic examination of the exudate was made.]

Förster⁹ reports from the Halle Surgical Clinic 15 cases of **sarcoma after injury**. Detailed reports are given of 2 cases.

Traumatic Endocarditis.—Litten¹⁰ has given a very good clinical lecture, illustrated by 4 personal cases.

Valve Rupture from External Injury.—F. Strassmann¹¹ reports

¹ Münch. med. Woch., July 1, 1901.

³ Deut. med. Woch., 47, 1900.

⁵ Aertz. Sachv. Ztg., 15, 1901.

⁷ Volkman's Vorträge, No. 281, 1890.

⁹ Thesis, Halle, 1900.

¹¹ Zeit. f. klin. Med., Bd. XLII: abst. in Viertelj. ger. Med., July, 1901.

² May 6 and 20, 1901.

⁴ Aertz. Sachv. Ztg., 23, 1900.

⁶ Mon. Unfallheilk., 8, 1901.

⁸ Mon. Unfallheilk., 11, 1900.

¹⁰ Aertz. Sachv. Ztg., 24, 1900.

a case, with autopsy, in a man of 65, struck on the chest by a horse's hoof. Two months later he was certified as suffering from valvular insufficiency due to trauma, and died within 6 months. The autopsy showed a healed fracture of the fifth to eighth left ribs, with adhesive pericarditis, great dilation of left ventricle, with a laceration in the aortic intima and media, 1 cm. by 2 cm., just above the anterior semilunar cusp, of which the left half was torn away from its line of attachment.

Rogina ¹ considers the term "**traumatic pneumonia**" applicable only to cases in which the person was previously healthy, and the lung is actually injured by the accident.

B. Stiller ² reports a case in which **pneumothorax from sneezing** occurred in a man with normal lungs. Recovery followed.

Significance of Trauma in Relation to Hernia.—Schott ³ gives a careful discussion of the effect on the question of causation of the variety of hernia in question, giving a full bibliography, with the varying views of all different writers.

Payr ⁴ reports 2 cases of traumatic **movable kidney** due to too energetic massage of the abdomen and flanks.

Neurosis after Electric Shocks.—Hoche ⁵ says the voltage has less influence than the time of exposure. Two thousand to 3000 volts may be borne. One hundred and fifty volts was fatal in one case of fatty degeneration of the heart. All objective signs, such as burning, as well as loss of speech or consciousness, may be absent. Four cases of traumatic neuroses are given: (1) Five hundred volt shock. Neurosis lasted for years. (2) Trolley-wire contact. Right hemianesthesia, disturbance of sight, depression, loss of control over bladder, and atrophy of deltoid. (3) Lightning stroke through telegraph key. Redness and swelling of left arm, recurring during thunder-storms for a period of 2 years. (4) After severe dazzling, an optic neurosis with amblyopia.

Erben ⁶ gives directions for detection of **simulation of nervous symptoms**. The actual occurrence of tenderness can be demonstrated objectively by dilation of the pupil on pressure on a tender spot, and by increase of the heart's action. A negative result of this test, however, indicates nothing. Vasomotor spasm is also significant in pains of the extremities from nerve injury and coldness of knees in sciatica. Stiffness is a good index of pain. In testing for localized tenderness it is well to press on the actual spot and also on another so close as to be felt as a single pressure. Rapid changing from one to the other is confusing to a simulator. In simulated radial or deltoid palsies, on forced motion against resistance with only slight force, if tremor occurs this indicates weakness; but if, against strong movements, both helpful and antagonistic muscles are brought into action, it shows that the person is not exercising his full strength. In testing the strength

¹ Abst. in Jour. des Praticiens, 6, 1901.

³ Mon. Unfallheilk., 3, 1901.

⁵ Münch. med. Woch., 25, 1901.

² Ungarische med. Presse, 44, 1901.

⁴ Münch. med. Woch., 50 u. 51, 1900.

⁶ Münch. med. Woch., 16, 1901.

of the hand-grip it should be less in fully flexed than with extended wrist, unless simulation is being practised. With reference to tremors, it is suspicious if they become coarser and more infrequent on prolonged observation, and if the breathing becomes deeper and uneasy, and the pulse rapid, with increase of blood-pressure. If, when some fingers are held, the tremor persists in the others, this speaks against simulation, as does also tremor in muscles without separate voluntary innervation. A tremor is genuine which does not cease or become altered when the patient's attention is suddenly and completely diverted. Tremor in the legs which ceases when the knees are bent and placed against the abdomen, and only recommences when the toes are brought back to the ground, is to be regarded as voluntary. Anesthesia should be accompanied by objective coldness. Romberg's sign is badly simulated. The patient usually falls without the genuine painful efforts at balancing. Genuine ataxies show greater steadiness when allowed support by the hand, while simulators omit to do so. If giddiness is not corroborated by other symptoms or a lesion explaining it, it is likely to be genuine if readily induced by artificial means.

Hartman¹ gives a very thorough study of uncomplicated **traumatic spinal diseases**, with 3 new cases.

Kirchgässer² has published further experimental studies of **spinal concussion**. Examination of the ganglion-cells in experimental cases by Nissl's stain showed no alterations. These were met with in the sheath of the nerve-fibers. The author considers that even in the absence of objective signs the onset of symptoms is rather late. After the injury the question of traumatic origin must be seriously considered.

Blood-pressure Estimation as a Means of Diagnosing Traumatic Neurasthenia and Hysteria.—Strauss³ says the persistence of increased tension in the absence of arteriosclerosis in renal disease or chronic lead-poisoning is calculated to corroborate the view that the person is actually suffering from a neurosis. In taking observations by means of a tonometer, opportunity is also given of pressing upon alleged tender points.

Medicolegal relations of **traumatic neurosis** are broadly treated of by J. H. Lloyd.⁴

Traumatic Zona.—Three cases are reported by Gaucher,⁵ in which zona occurred after injury of the nerves supplying the affected area.

E. Wendel,⁶ in discussing **trauma and epilepsy**, lays down the principle that before admitting genuine traumatic epilepsy we must exclude (1) cortical epilepsies from injury of the skull and brain; (2) alcoholic epilepsy with trauma only as an exciting cause; (3) epileptic attacks in cerebral syphilis; (4) hystericepileptic seizures; (5) reflex epilepsy from fright. Apart from these, very few genuine cases occur. It is very rare in adults, and in children the importance of the influence of trauma is often overstated.

¹ Jahrb. psych. Neurol., 19, 1901.

² Neurol. Centralbl., 2, 1901.

³ Soc. Méd. des Hôp., Feb. 22, 1901.

⁴ Deut. Zeit. f. Nervenheilk., XVII, 422.

⁵ Jour. Am. Med. Assoc., Sept. 22, 1900.

⁶ Aerzt. Sachv. Ztg., 2, 1901.

Strauss¹ records some rare traumatic forms of **nerve and heart-muscle paralysis**.

Paranoia after Trauma.—Meyers² gives an official medicolegal report of a case.

General Paresis after Head Injury.—Lin³ gives a case report. The patient was free from syphilis, alcoholism, and hereditary tendency. The symptoms began promptly after falling with the head against a piece of furniture. Death followed in 3 years. At the autopsy a local thickening of dura, with adhesion to pia and a thinning of inner table, was found at the seat of injury.

E. Meyer⁴ relates a case of **chronic anterior poliomyelitis** after trauma, which followed a stumble in which a leg was sprained. The patient was 57 years old and had previously been healthy. Multiple neuritis was excluded.

Krafft-Ebing⁵ discusses the connection between **neuralgia and transitory psychoses**. He reports 2 new personal cases, both coming on from severe sudden onset of toothache. In one the subject was delirious for some hours; in the other an attempt at suicide was made. In the first case there was no recollection of the occurrence.

Traumatic Optic Atrophy.—Pechin⁶ gives a case report. The condition was one of blow on the face, slightly contusing an eyelid and stunning the patient. The next day there was total blindness in the left eye, followed by atrophy of the optic nerve in 2 weeks.

Gorecki⁷ deals with **labor accidents affecting the eye**, both from a sanitary and a medicolegal aspect.

G. Bonnefoy⁸ has dealt with the legal and medicolegal relations of **deaf-mutism** in a monograph of 400 pages.

Seeligmann⁹ encountered **trauma and extrauterine pregnancy** in 5 cases, 4 from a fall in sitting posture, and 1 from springing from a height and landing on the feet. The author's explanation is that the conception had taken place shortly before, and that the effect of the trauma was to drive the ovum into the epithelium of the oviduct or out of the fimbriated end of the tube upon the ovary.

P. Regnier¹⁰ mentions the occurrence of **retroperitoneal hemorrhage** in the pelvis as the result of an injury.

MEDICOLEGAL TESTS.

Diagnosis of the Origin of Blood Stains.—In order better to understand the significance of the recent work on this subject, it will be advisable to recall the previous work by J. Bordet,¹¹ who wrote upon the hemolysis or solution of red blood-cells by serum of animals

¹ Charité Annalen, 25. Jahrg.

² Deut. med. Ztg., 4, 1901.

³ Zeit. f. Psych., Bd. LVIII, H. 2 u. 3.

⁴ Paris Thesis, 1901.

⁵ Deut. med. Woch., 26, 1901.

⁶ Mon. Unfallheilk., 8, 1901.

⁷ Münch. med. Woch., 5, 1901.

⁸ Progrès Méd., 7, 1900.

⁹ Paris, Larose, 1900.

¹⁰ Mon. Unfallheilk., 9, 1901.

¹¹ Ann. de l'Institut Pasteur, Oct., 1898, and Apr., 1899; La Semaine Méd., 1899, p. 222.

injected with defibrinized blood. The main results of Bordet's observations may be summarized as follows: He found that guinea-pigs injected with the defibrinated blood of rabbits acquire the property of agglutinating and dissolving the blood-cells of rabbits. It was also possible to agglutinate and dissolve the blood elements of fowl by means of the serum of a rabbit, which had been injected with defibrinated fowl's blood. These serums thus become antihematic, and contain certain globulicidal substances peculiar to them. The effects are due to alexins destructible at 55° C. Thus the power of dissolving is destroyed when the serum is heated to that temperature. It is regained when, after such heating, fresh serum is added, because the alexin is contained in the serum. Preexisting in normal serum, where it is only slightly active, the globulicidal substance acts more energetically in the presence of the serum of animals which have received the above-mentioned injections, because it is combined with another specific substance proper to the active serum, resisting heating to 55° C. and favoring the action of the alexin. It is thus the union of two substances which gives the globulicidal power. One of these substances, the alexin, exists in the natural state in the serum of the animal; the other, a specific substance, characterized by antihemic properties, being introduced from without. The association of these two substances may also be accomplished *in vitro* by mixing simple serum, containing the alexins, with active serum treated or not, to 55° C.

Studies on **lactoserum** and the **cell-serums**, confirming and extending those of Bordet, were made by C. Fisch¹ and others. The results were chiefly of interest from the standpoint of physiologic chemistry, and no medicolegal application was suggested.

Uhlenhuth² made the next advance in a communication on a **biologic method of identifying egg-albumen**. The white of 2 or 3 eggs was injected into the abdominal cavity of rabbits at intervals of several days, and after several such injections the serum of such animals showed a decided turbidity when diluted with salt solution and mixed with egg-albumen. The various other protein compounds—nitrose, peptone, etc.—gave no reaction. With pigeon serum a positive reaction was obtained. The serum could be heated 1 hour at 60° C. without losing the property of reacting. Soon after this, the matter was definitely settled by Uhlenhuth's³ method for the **recognition of specific blood reactions**. The author injected, at intervals of 6 to 8 days, about 10 cc. of defibrinated ox-blood into the peritoneal cavity of rabbits. After the fifth injection an active serum was thus obtained, which gave the characteristic precipitate with blood of the ox. He first made solutions of the blood of various animals in tap water and added sufficient water to these to give a uniform concentration of 1%. To get rid of the disturbing influence of portions of stroma these were filtered or precipitated. Of the clear solution thus obtained, 2 cc. was mixed with a corresponding amount of 1.6% double normal salt solution in a narrow test-tube (0.5 centi-

¹ St. Louis Courier of Med., Feb., 1900.

² Deut. med. Woch., 46, 1900.

³ Deut. med. Woch., Feb. 7, 1901.

meter wide). It is very important to employ salt solution, as normal rabbit's blood mixed with water gives a turbidity which may be confounded with the specific reaction. In physiologic salt solution this turbidity does not occur. In this manner blood solutions were prepared from the following animals: Ox, horse, ass, pig, sheep, dog, cat, deer, hare, guinea-pig, rat, mouse, rabbit, hen, goose, pigeon, and dove, as well as from human blood. With a capillary glass pipet 6 to 8 drops of the blood of the rabbit treated with ox-blood was added to each tube. A turbidity promptly appeared in the tube containing ox-blood. All the rest of the tubes remained perfectly clear. After prolonged observation the turbidity became more intense, and a precipitate formed. Normal rabbits' blood caused no turbidity in ox-blood. Professor Löffler was able, without difficulty and without previous knowledge of the course of the experiment, to pick out the tube containing ox-blood solution from the 19 unlabeled tubes. Following this, Uhlenhuth introduced human blood into the peritoneum of rabbits and was able to pick out the solution of human blood in an analogous way, and thus to obtain a specific test for recognizing human blood. The reaction was found to be exceedingly delicate, so that traces of blood merely suffice to distinguish the species from which the blood is obtained. It is necessary to have in readiness specimens of blood from animals previously treated in this way. The preliminary treatment is to be continued until the blood solution reacts promptly. Uhlenhuth was also able to establish that blood dried for 4 weeks on a board could be readily recognized as human blood when tested by this method—"a fact which should be of much medicolegal significance." He considered that the reaction depended on the presence of a specific precipitate in the sense employed by Ehrlich, as had been already found by Bordet and Wassermann in casein of milk, and independently by Meyers and Uhlenhuth.

A. Wassermann and A. Schütze¹ about the same time made public their new forensic method for identifying blood. This communication, which was contributed independently of that of Uhlenhuth, was read before the Physiological Society of Berlin, February 8, 1901, thus one day subsequent to the publication of Uhlenhuth's article; but their results had been demonstrated some weeks previous to those of Professor Strassmann, of Berlin. The authors give a careful literary review of the preliminary studies of Bordet,² of Wolf,³ and of Tsistowitsch,⁴ explaining that the principle of the reaction depends upon the phenomena first observed by Bordet. [Both Uhlenhuth and the authors appear to have overlooked the fact that the application to legal medicine of Bordet's specific hemolytic reaction had been already made by Deutsch,⁵ of Budapest, in the preceding year.] The work of Myers,⁶ dealing with the precipitation of casein by injection of milk-product, is cited, as well as that of Uhlenhuth, on the effects of egg-albumen,⁷ and that of C. Fisch.⁸ The experiments of the authors

¹ Berlin. klin. Woch., 7, 1901.

² Ann. de l'Institut Pasteur, 1899 and 1900.

³ *Ibid.*, 1900.

⁴ *Ibid.*, 1900.

⁵ Bull. Medicolegal Sec., Internat. Cong., Session of Aug. 8, 1900.

⁶ Centrabl. f. Bakt., 1900, 28, No. 8 u. 9.

⁷ *Loc. cit.*

⁸ St. Louis Courier of Med., Feb., 1900.

were made by injecting rabbits subcutaneously with 5 or 6 injections, of 10 cc. each, of human blood-serum free from cells, giving the injections at intervals of about 2 days. Six days or so after the last injection the animals (which had stood the treatment well) were bled and the blood placed on ice to separate the serum. This was diluted either with human blood diluted with normal salt solution, or with distilled water. Active precipitation appeared promptly at room temperature, and still more promptly at 37° C. In this way it was tested with the blood from horse, ass, goat, cow, ox, calf, sheep, hog, dog, cat, ape, guinea-pig, mouse, rat, goose, duck, hen, sparrow, eel, and perch. It was found that in no case was a reaction produced, except with the blood of the ape, in which, after a long time, a slight precipitate was formed. This result was regarded as of much general biologic importance, as indicating that the reaction was furnished imperfectly in the blood of allied species; but for practical medicolegal purposes the question of stains being produced by the blood of apes was hardly likely to introduce a serious source of error. Of greater practical importance was the question of the conditions under which the reaction could be obtained, and to what extent the influences of drying, elapse of time, and decomposition would interfere with its accuracy. It was found that stains 3 months old, and in which methemoglobin-forming had advanced, gave a brown, opaque solution at first, but when these were cleared by filtration (perfect clearness of the solutions was indispensable to success), the reaction appeared in 20 minutes. With the bloods of birds and fish, which are liable to contain traces of fat, repeated filtration may be necessary. They recommend the injection of rabbits with 8 cc. to 10 cc. of human serum 5 or 6 times on alternate days, and bleeding the animals to death 6 days after the last injection, so that the blood is received with aseptic precautions and placed in a vessel on ice. From the material to be tested the blood is dissolved as fully as possible with salt solution, and filtered, the filtrate divided into two portions and placed in two sterile test-tubes. To one of these is added 0.5 cc. of the blood of the rabbit treated as above with human serum, and the other, for control, treated with 0.5 cc. of the serum of a normal rabbit (*i. e.*, not treated with human blood). In a third tube, serving also for control, is placed 4 to 5 cc. of the blood solution, or watery solution of the blood solution of another species of animal (sheep or hog), and the three tubes exposed to a temperature of 37° C. If the tube containing the suspected material within $\frac{1}{2}$ to 1 hour shows turbidity and formation of sediment, while the others remain clear, the proof is furnished that, unless (in some exceptional way) the stain is derived from ape's blood, it must have been from that of man. The authors point out correctly that the utilization of the Bordet phenomena of hemolysis was not well suited to the medicolegal applications of the test, as to employ the phenomena satisfactorily requires the obtaining, in the first place, of a considerable number of intact red blood-cells, which is practically out of the question in most cases.

G. H. F. Nuttall¹ gives a very full review of the literature concern-

¹ Jour. of Hyg., July, 1901; Brit. Med. Jour., Sept. 14, 1901.

ing **specific antibodies in the blood** and their use in legal medicine. In his personal experiments he used largely strips of filter paper to preserve the defibrinated blood and serum. Neither drying nor the addition of chloroform as a preservative interferes with the reaction. He tested 36 kinds of blood, comprising that of man, 4 species of monkeys, kangaroo, capibara, polecat, suricate, squirrel, guinea-pig, tame and wild rabbit, white rat, black rat, horse, ox, sheep, gnu, deer, pig, dog, cat, bat, pigeon, cheetah, pheasant, swan, duck, chaffinch, crossbill, swallow, corn-crake, frog, newt, and snake. The results were typical except in the following cases: Rabbits treated with sheep serum gave a slight reaction with blood of gazelle and axis-deer. There was slight clouding with blood of the ox, squirrel, and swan. Rabbits with ox serum gave a reaction (slight) with serum of gazelle and axis-deer, and slight clouding with those of the gnu, sheep, squirrel, and swan. Rabbits with horse serum only showed marked clouding with human blood-serum. A very faint clouding appeared in the blood of the horse, ox, and sheep. The human nasal and lacrimal secretions gave slight but distinct reactions. Tests made with dried blood gave perfect reactions in dilutions equivalent to 1:100. Horse serum 2 to 2½ years old gave typical reaction. Mixtures of antisera or blood only reacted when brought in contact with a homologous serum, the reactions being present in 1:500 to 1:600 dilution. In a subsequent paper Nuttall gives a preliminary account of some comparative studies on a series of 140 different bloods, with results consistent with those already described. It was found that the South American monkeys gave a much feebler reaction with human blood than the old-world monkeys. The antiserum of the dog's blood only reacted with that of the jackal. Sheep's blood reacted slightly with that of the goat and roebuck.

L. Deutsch¹ has published a paper on **diagnosis of blood stains** by the hemolytic serum reaction of Bordet. This report is published in the transactions of the Section on Legal Medicine for August 8, 1900, and states in substance that the author had successfully applied the test of hemolysis, for identifying the origin of blood stains, stating that "the diagnosis is extremely easy; one has only to dissolve the stain in a salt solution of 9 per 1000 and add several drops of the hemolytic serum and study the red corpuscles closely. The serum which dissolves the red blood-cells most rapidly (in a few minutes) indicates absolutely and with certainty (*à coup sûr*) the origin of these red cells." The diagnosis is easy and certain. Provided the expert has at his disposal hemolytic serums for the common domestic animals (dog, cat, ox, sheep, goat, horse, and rabbit), he will be readily able to solve the question as to the origin of the blood stains. [This rather summary description of the author's views would seem entitled to priority over the publication of Uhlenhuth, though it did not officially appear until 1901, as it was not among the preliminary reports published at the time of the meeting, and attracted little or no attention in the medical press at the time. The hemolytic method, for

¹ Bull. Thirteenth Internat. Cong., Paris, Aug. 8, 1900.

reasons explained by Wassermann and Schütze, is far less convenient and generally applicable than that of precipitation of the antibodies. It is evident that Deutsch had outlined a more or less feasible method of applying the test prior to Uhlenhuth's first publication. Strange to say, no reference to his work appears in the articles of Uhlenhuth, Wassermann, Stern, or Nuttall.]

A number of authors have since published confirmatory testimony and added to our knowledge of the processes in question. R. Stern,¹ in writing on the **recognition of human blood** by antiserum, reports, on February 28, 1901, the result of studies also undertaken independently. He found that rabbits injected subcutaneously with 5 to 10 cc. of human blood-serum, at intervals of 2 days or more, produced after 2 or 3 weeks a precipitate with human serum. The same result was obtained with albuminous human urine or solution of dried human blood, and was not produced by the blood of horses, sheep, oxen, or hogs. It was found to be produced, though feebly, by the blood of crown and Java apes. [It had been shown by Bordet in 1899 that the Bordet hemolytic reaction in rabbits injected with hen's blood was caused faintly by that of doves.]

The recognition of **human blood stains** is also dealt with by Ogier and Herscher,² who confirm the statements of Uhlenhuth and find that serum preserved in the cold for 3 minutes preserves its delicacy as a reagent for the test.

G. Corin³ has also published results **confirmatory of the observations of Uhlenhuth**, and prefers his method to that of Deutsch. Carrara,⁴ writing on the medicolegal diagnosis of blood, finds the statements of Uhlenhuth and Wassermann correct. C. Binda,⁵ working on the diagnosis of blood by the specific serum reaction, gives also affirmative testimony. Several other writers have still more recently written about the test, recording its successful use in forensic cases, but no additions of importance have been made to our knowledge on the subject.

Microscopic Blood-examination.—Richter⁶ concludes that: (1) This test should be preceded by the spectroscopic or hemin tests. (2) If these are positive, the microscopic examination should reveal whether the blood is mammalian or not. (3) Unless the conditions are exceptionally favorable the size of the red corpuscles is not a safe criterion as to the particular species of mammal. (4) The leukocytes and blood-plates give no diagnostic indications. (5) Absence of fibrin may indicate menstrual or defibrinated blood. (6) The presence of special extraneous objects (hair, etc.) may be important. (7) The age of the stain cannot be diagnosed from its microscopic character.

L. Wacholz⁷ finds that **hemin crystals** can be obtained by employment of any of the strong mineral or organic acids, if these are used mixed with 90 % to 95 % alcohol. The hemin reaction is best made in an ordinary or hollowed glass slide or on a watch-glass, prefer-

¹ Deut. med. Woch., 9, 1901.

³ Arch. d'Anthrop. Crim., July, 1901.

⁵ Gior. di Med. Legali, Mar., 1901.

² Ann. d'Hyg. Pub., June, 1901, p. 538.

⁴ Arch. per le Scienze Med., xxv, 1901.

⁶ Friedreich Bl., Nov., 1900.

⁷ Viertelj. ger. Med., Apr., 1901.

ably with alcohol and $\frac{1}{10000}$ concentrated sulphuric acid, or with equal parts of alcohol and lactic or acetic acid. The warming should be gentle so as not to boil the sample away rapidly.

Quantitative Examination of Blood Stains.—F. Strassmann and E. Ziemke¹ have investigated the question of estimating the amount of blood stains forming. It was found that with fresh blood stains—not over a week old and not decomposed—colorimetric tests enabled the quantity to be calculated within 15%, the blood being dissolved in distilled water. For longer periods the best results were obtained by weighing the amount of blood present in a given volume or weight of material. The results thus obtained were found accurate within 20%.

The use of **hemoglobin crystals for identification of blood** is advised by Moser,² who found that from fresh or recently dried human blood hemoglobin crystals can be readily obtained which are so characteristic as to be readily distinguishable from the blood of the domestic animals.

Florence³ recommends the **solution of the stain** in Virchow's fluid (30% KOH), which permits, first, the determination of the corpuscles, and, next, by means of the (so-called) microspectroscope, two reactions, that of alkaline hematin and that of hemochromogen, to be made. The latter may be permanently preserved by sealing the preparation hermetically.

E. Ziemke⁴ has tested Magnamini's statements as to the **unequal resistance of blood-pigment of various animals to alkalies** and its application to identification of blood stains, with confirmatory results. He found the number of minutes required to decompose the hemoglobin to be about as follows in fresh blood solutions: Man, 1; dogs, $2\frac{1}{2}$ to 3; sheep, 8 to 11; horse, 30 to 40; pig, 25 to 45; cattle, 40 to 67. With dried blood stains the results were less uniform, but human blood stains dried for 5 years were decomposed 3 times as rapidly as the blood of the above-mentioned animals dried for 3 months. [The test is less likely to be of practical use in view of the remarkable discoveries of Uhlenhuth and Deutsch.]

Y. Okamoto,⁵ investigating the occurrence of **spermatozoa in the seminal vesicles**, finds that the statement of M. Leprince,⁶ that no spermatozoa are found in the seminal vesicles, is not correct. His conclusions are based on the results of 16 examinations, conducted under Professor F. Strassmann, of Berlin.

Mari⁷ has made studies on the **spermatic crystals of Florence**, and finds the reaction absent in secretions taken direct from the epididymis of animals; but ox-semen gives it, as do seminal stains from some other animals under certain conditions of long exposure to moisture. Watery extract from the semen of animals always gives a reaction, even in azoospermia. The reaction disappears in the extract or dissolved stains when decomposition is advanced. Fresh human semen and dried stains

¹ Viertelj. ger. Med., Apr., 1901.

³ Arch. d'Anthrop. Crim., May, 1901.

⁵ Viertelj. ger. Med., July, 1900, S. 180.

² Viertelj. ger. Med., July, 1901.

⁴ Viertelj. ger. Med., July, 1901.

⁶ Thesis, Paris, 1899.

⁷ Russian Arch. of Path. and Bact., 1900, H. 1.

give typical reactions. The reaction is best seen by allowing the fluids only to come in contact at their margins. Ox-semen is that most closely allied to human semen, and is distinguished by not giving the reaction when fresh.

The **forensic significance of Florence's crystals** is also discussed by another Russian author. N. Bocarius ¹ has made an extensive study of the various recent publications on the subject, and tested personally all the important statements made. He finds that drying or putrefaction of the semen and its exposure to high temperatures do not affect the reaction. The shape of the crystals varies somewhat with the conditions under which the test is made. The nature of the substance which gives rise to the reaction is not known.

Medicolegal Study of Hairs.—E. S. Loudon ² finds that we cannot distinguish with the naked eye the hairs of an immature embryo from others of animal or vegetable origin. Human lanugo appears transversely marked on the surface and covered with lumpy crystalline deposit. The edges are more or less parallel and medullary substance is completely absent. Downy hairs from animals are also transversely striped, but show no deposit, having instead long and spiky projections pointing outward toward the tip. Acids, alkalies, salts, and oils alter hairs only slightly, but javelle water destroys their appearance in $\frac{1}{2}$ to 1 hour, and leaves only indefinite yellow masses. An examination of the hairs of 37 species of animals showed no two to be identical microscopically, but hairs from allied species resemble each other closely. Of the animal hairs very few resembled human hairs, those of the pig, zebra, horse, and ox being the closest. In these animals the cuticle had the same fine scaly appearance, with the narrow, unbroken medulla, and the same conical form as in man. The differences consist in the dark medulla of the human hair having a clear, glistening, smooth, and uniform appearance when seen by reflected light. The medullas of animal hairs look equally clear, but are dull and finely granular. The author further studied 300 hairs from the various regions of the body, and became convinced that one is often able to decide from what part of the body they are derived. The appearances of the hair-root are important and are classified into three types: (1) Pulled-out, irregular, with uneven wavy surface and projections, and juicy when fresh; from various regions, but not from eyelashes, which resemble more fallen-out hair; (2) small roots with smooth surface and rounded butts, usually from hairs which have fallen out; (3) transitional forms in hairs which have been combed out. To distinguish gray from blond hairs, on employment of polarized light the cross shows blond hairs as golden yellow cords, and gray hairs dark purple. Black hairs appear yellow after heating with chlorin water in acetic acid. Dilute nitric acid colors black hairs bright red without altering the microscopic structure. Caustic alkalies decolorize the black hairs and at the same time dissolve them. Anilin and clove oil decolorize slowly without destroying. Arsenic was found in the hair of animals to which it had been given.

¹ Viertelj. ger. Med., Apr., 1901.

² Vratich, 1900, 47.

Errors caused by false interpretation of the **Röntgen rays**, and **their medicolegal aspects**, are discussed by C. Beck.¹

Corbey,² in writing upon the medicolegal value of **hepatic docimasia**, reports several cases in which the glycogen test was found of practical value.

Vervaeck³ also publishes his confirmatory statements as to the value of hepatic docimasia in **diagnosis of sudden death**.

E. Ungar⁴ studied experimentally the influence of **putrefaction on the pulmonary air-test**, and concurs in the views maintained by Bordas and Descoust, that the occurrence of early putrefaction is a very strong proof of respiration having occurred, and that the causes of error are such as are unlikely to exist in the great majority of cases.

G. Sarda⁵ has made a number of observations in which both the excised lungs and the entire cups of stillborn fetuses were exposed under water, manure, or soil, or in the open air, to see whether **gaseous putrefaction** took place. It was found that this did not occur in the excised lung, or at most a few isolated bubbles were produced. In the buried bodies, on the other hand, 25 days in winter or 10 days in summer sufficed to produce sufficient gas to float them. The gas is not contained in the alveoli or bronchioles, but in the interalveolar septa. In such conditions, after puncture of the alveoli, the organs sink.

Action of Smokeless Powders on Clothing.—Thoierot⁶ reports that the incrustation of powder grains is common to all the series. The grains are coarse and penetrate the skin with violence, lacerating it. The tattooing has a special distinction that, differing from that of gunpowder, bichromate powder "J" gives a beautiful green tint, recognizable at a glance. "S" powder gives a gray tattooing, and portions of the wad are liable to become attached.

Helminthology was applied to legal medicine in an ingenious way by A. Lacassagne,⁷ who relates a case in which an old woman was found in bed strangled and with her skull fractured. A solid fecal mass weighing 150 grams was found in the bed, wrapped in a folded sheet. The feces were found to contain adult oxyuris and ova. The parasite was absent from the feces of the victim, but was readily found in the stools of one of the persons accused of having murdered the woman. The other evidence was strong. The man was sentenced to death.

TOXICOLOGY.

Arsenic-poisoning.—Prölls⁸ has written a monographic article on the subject in its medicolegal aspects.

Poisoning from Arsenical Beer.—An extensive outbreak of this kind occurred in Manchester, England, in which over 4000 severe cases occurred amongst beer drinkers. Peripheral neuritis was a prominent

¹ Med. Rec., Aug. 25, 1900.

² Hayez, Brussels, 1901, p. 36.

³ Ann. d'Hyg. Pub., Oct., 1901.

⁴ Arch. d'Anthrop. Crim., Jan., 1901.

⁵ Arch. d'Anthrop. Crim., Jan., 1901.

⁶ Viertelj. ger. Med., Jan., 1901.

⁷ Bull. Soc. de Méd. Légal, Nov., 1900.

⁸ Friedreich Bl., July, 1901.

symptom. The cause of the trouble was traced to the presence of arsenic in some sulphuric acid used for the purpose of inverting sugar used for brewing purposes during the month of March, 1900, and probably before that. Reynolds¹ first called attention to the real nature of the outbreak, which was studied also by Délepine² and Tattersall.³ A good account of the whole matter is given by F. Bordas.⁴

Knecht and Dearden⁵ made an examination of **hair in arsenic-poisoning**, and showed arsenic to the amount of 0.3 in 10,000. In a control case arsenic was present, but in too small quantities to be estimated.

Morphin-poisoning.—Troegel⁶ presents a monographic article on the subject in its medicolegal aspects.

Fatal Petroleum-benzin Poisoning.—Racine⁷ found that the blood-pigment was altered, giving rise to a carmin-red color of the organs. The organs were found to be beset with small ecchymoses. There was severe inflammation of the digestive tract.

Anesthesia for Criminal Purposes.—Putaud⁸ considers the evidence in the case against Pillot, in which a number of instances were alleged when acts of lubricity were supposed to be practised on persons under the influence of chloroform, who declared they were conscious of what took place.

QUESTIONS RELATING TO SEX.

P. Brouardel⁹ has published a monograph on **abortion**, uniform with the medicolegal lectures which he has been publishing during the past few years.

H. Fritsch¹⁰ deals in a comprehensive way with the medicolegal bearing of obstetric problems.

Nengebauer¹¹ has collected the details of 50 cases of **divorce granted on account of an error of sex** having been established. In 46 cases the parties were males and male hermaphrodites. In 3 cases a female had married a female hermaphrodite. In one of the latter cases the husband had been delivered of a well-formed male child at term. In another case a male hermaphrodite had lived successively with 3 husbands, the last of whom demanded divorce after having been infected by his partner with venereal disease.

The legal bearings of **syphilis and gonorrhea** are made the subject of a monograph by W. Radeck.¹²

A. Haberdar,¹³ in studying the **anatomic evidences of rape**, was able to pass postmortem a glass cylinder, 4.4 centimeters in diameter and 14.8 centimeters in circumference, through the circular hymen of a girl of 15 without causing a rupture. In 40 cases of rape in females

¹ Brit. Med. Jour., Nov. 20, 1900.

⁴ Ann. d'Hyg. Pub., Aug., 1901.

⁶ Friedreich Bl., July, 1901.

⁸ Jour. de Méd. de Paris, Feb. 31, 1901.

¹⁰ Gerichtärztliche Geburtsh., F. Enke, Stuttgart, 1901.

¹¹ Ann. d'Hyg. Pub., Feb., 1901, p. 182.

² Ibid.

⁵ Lancet, Mar. 23, 1901.

⁷ Viertelj. ger. Med., July, 1901.

⁹ Paris, Baillieu, 1901.

¹² Costenoble, Jena, 1900, 148 pages.

¹³ Monatssch. f. Geburtsh. u. Gynäk., II, 1900.

varying from 10 to 28 years of age, with complete penetration and frequently repeated acts of connection, 50 % of the cases showed no anatomic lesions or signs of defloration. Haberda holds that a reliable sign of healed rupture is the complete division of the hymen at one or more places, the edges of the cleft being separated and the base extending, even if only slightly, into the vaginal wall.

In monographs by J. Bayer,¹ on **rupture of the umbilical cord** and its effect on the newborn,² and on **precipitate labor**,³ the literature is carefully reviewed and criticized. It is pointed out that Winkel met with only 1 case of precipitate labor out of 216 when fatal injury occurred to the child. On the other hand, the tendency of the erect position to cause fainting on the part of the mother is emphasized.

Injury of Vagina during Coitus.—Bohnstedt⁴ says that the existence of a tear in the posterior vaginal wall was thought to be connected with special efforts on the part of the female, and therefore injuries in that region should be accepted only with strong reserve as evidence of rape.

Medicolegal Significance of the Lochia.—Brouha⁵ considers that the presence of large flattened decidual cells in the discharge is of much diagnostic significance; but as intermediate forms cannot be distinguished with certainty from some of the cells of the vagina, it is necessary that the specimens for examination be taken from within the cervix.

Neugebauer⁶ relates 70 cases of **difficult delivery of the head**. He considers that separation of the head from the body and ill effects on the mother from the resulting manipulations do not constitute a punishable offense on the part of the physician. He found a remarkable tolerance of the uterus for portions of the head or placenta left behind. In some cases these remained 10 years.

Löffler⁷ reports a case of **autoesarean section** in a woman in Bosnia, aged 42, suffering from tuberculosis and osteomalacia. She feared to die before the child was born, and so, with an ordinary pocket knife, performed the operation on herself and then lost consciousness. When her consciousness returned, she called her daughter of 13 years and asked her to sew up the wound. This was done with waxed linen thread. The patient was only seen by a physician 2 days later, but the wound healed by first intention, and both mother and child did well. The husband was shown to be absent at the time, and very careful inquiry failed to throw doubt upon the case.

A medicolegal study of **superfetation** is given by Dejourney.⁸

Causes of Natural Abortion.—Brouardel⁹ has published separately one of the chapters of his monograph on abortion.

Priority of birth and death among twins is ably discussed by Dejourney.¹⁰

Viability from a Medicolegal Standpoint.—P. Dubisson¹¹ ac-

¹ Viertelj. ger. Med., Apr., 1901, S. 362.

² *Ibid.*, 289. ³ Centrbl. f. Gynäk., 23, 1901.

⁴ Centrbl. f. Gynäk., 7 u. 8, 1901.

⁵ Rev. de Méd. Légal, Nov., 1900.

⁶ Rev. de Méd. Légal, Apr., 1901.

⁷ Volkman's Vorträge, 269.

⁸ Viertelj. ger. Med., Jan., 1901.

⁹ Wien. med. Woch., 1901, 10.

¹⁰ Ann. d'Hyg. Pub., Dec., 1900.

¹¹ Arch. d'Anthrop. Crim., Jan., 1901.

cepts as evidence of viability a length of 32 centimeters or over and a weight of 2 kilograms; skin not too red, firm, and covered with vernix; bones of skull solid and rounded outward; hairs a little long and brown or blond; eyelids partly open; pupillary membrane at least partly disappeared; nails with some consistence and reaching nearly to ends of fingers. Half the length of the body should be not far above the attachment of the cord. Auscultation should show penetration of air into all parts of the lungs and regular pulsations of the heart. The movements should be active and intense, and cries loud and full. The child should try to suck a finger introduced in the mouth, and should evacuate urine and meconium.

MENTAL CONDITIONS.

Beehterew¹ relates a case in which **periodic attacks of retroactive amnesia** developed after an attack of apoplexy in a male patient 67 years old, the subject of arteriosclerosis. Adler² also discusses the importance of retroactive amnesia in legal medicine.

Troeger³ presents a monographic article on **mental disturbances following trauma**.

Psychic Changes after Injury of the Skull.—Rothmann⁴ reports 51 new cases, 44 male and 7 female, classified as follows: Mania, 3; melancholia, 8; cyclic, 1; primary dementia, 4; paranoia, 15; paresis, 5; imbecility, 13; epileptic insanity, 2. There were 10 recoveries, 3 deaths, 10 improved, and 23 unimproved. These cases formed 3% of all the male and 0.4% of the female cases admitted to the Bonn asylum during the decennial period from which the cases are drawn. [The relatively larger proportion of paranoiacs is striking and important.]

Krafft-Ebing's well-known work on **medicolegal psychiatry** has been translated into French by Redmond.⁵

MEDICAL JURISPRUDENCE AND LEGAL DECISIONS UPON MEDICAL QUESTIONS.

[Most of the following have been condensed from the medicolegal reports in the "Journal of the American Medical Association."]

The Supreme Court of California⁶ decides that in the absence of statutory provisions there is **no property in a dead body**. It is not part of the estate of a deceased person, and a man cannot by will dispose of that which will be his corpse.

The Iowa Supreme Court⁷ decides that there can be no recovery of damages for **injury due to fright**, caused by the negligence of another, without immediate personal injury. The same rule is to be applied to animals.

The Supreme Court of New Jersey⁸ does not see how the **value of a boy's life** can equal \$5000, and limits action to \$2000.

¹ Monatssch. f. Psych., Nov., 1900.

² Friedreich Bl., July, 1901.

³ Toulouse, Tisseau, 1901.

⁴ Lee vs. city of Burlington.

⁵ Rivista de Psichiatria Forense, 2, 1901.

⁶ Viertelj. ger. Med., July, 1901.

⁷ Ems vs. Snyder.

⁸ Rowe vs. N. J. and N. Y. Telephone Co.

G. Morache ¹ has published a summary of the laws and regulations governing medical practice in Paris.

The right of third parties to be represented by experts at medicolegal inquiries has been maintained by the Medicolegal Society of France.²

The Supreme Court of Indiana ³ fully recognizes the physician's right to refuse to attend a case in emergency, although a fee is tendered, as it is simply a refusal to make a contract.

Nonrecovery of Fees in a Case in which the Physician Has Retired from the Case.—Southwark ⁴ (Eng.), April 30, 1901 (*Mat-cham vs. Lacy*), holds that while a physician has a right to retire from a case, he cannot claim fees unless the case is treated to a conclusion.

Medical Secrecy.—The Appellate Division of the Supreme Court of New York ⁵ decides that a physician may, without breach of privilege, tell the jury exactly what occurred during a physical examination made for the purpose of testifying in a case, as far as these occurrences relate to acts and exclamations of the patient and do not embrace statements made by the patient to the physician.

The plaintiff in a recent French case had applied for fraudulently obtained insurance. As the evidence of fraud was obtained by a violation of professional secrecy, the company was ordered to pay.

The Supreme Court of Iowa ⁶ rules that a physician may not testify as to whether a patient was suffering from delirium tremens when called to attend him for fracture of leg. The matter is confidential and privileged.

The Appellate Court of Indiana ⁷ holds that what a witness who had his headquarters in a doctor's office hears a patient say is not privileged as secret to such witness.

The Supreme Court of California ⁸ holds that future need of medical services is a proper subject for expert testimony.

The Supreme Court of Louisiana ⁹ decides that experiments made in the absence of parties interested are of the nature of hearsay evidence.

The Court of Appeals of Kansas ¹⁰ decides that disclaiming to be an expert is not a disqualification.

The Appellate Court of Indiana ¹¹ holds that under the statute a physician changing his residence to another county requires a fresh license before he can sue to recover.

The United States Circuit Court ¹² decides that the person who enters a charitable hospital as a beneficiary is not a contractor and cannot maintain a suit against the administration of that establishment. He must take the bounty for what it is worth.

¹ Paris Alcan, 1900.

³ Hurley vs. Eddingfield.

⁵ Zingrebe vs. Union Ry. Co.

⁷ Masons' Union Life Ins. Assoc. vs. Brockman.

⁸ Martin vs. Southern Pacific Ry. Co.

¹⁰ Walker vs. Scott.

² Ann. d'Hyg. Pub., Feb., 1901, p. 157.

⁴ Brit. Med. Jour., May 4, 1901.

⁶ Finnegan vs. Sioux City.

⁹ Seibert vs. McManus.

¹¹ Mayfield vs. Nab.

¹² Powers vs. Mass. Homeopathic Hosp.

The Michigan Supreme Court ¹ held that a physician may not give an **expert opinion** based on an appearance of the patient at the time of the treatment.

The Indiana Supreme Court ² reviews the evidence of the **right of the trial court to order physical examinations** in damage suits, now only denied by the Federal Supreme Court. The power was denied in a Missouri case in 1873, and affirmed in Iowa in 1877, and affirmed subsequently in Georgia, Alabama, Arkansas, Kansas, Kentucky, Michigan, Missouri, Minnesota, Nebraska, Pennsylvania, Ohio, Texas, and Wisconsin. The following propositions are established: (1) Trial courts have power to order medical examinations, by experts, of injured parts of a plaintiff trying to recover damages therefor. (2) Defendants have not absolute right to demand the enforcement of such an order, but it is left to the discretion of the court. (3) The order must be applied for before trial. (4) Its refusal may reverse judgment or justify dismissal.

The Supreme Court of Nebraska ³ rules that when a person is **insured against being "wholly disabled"** from transacting any and every kind of business pertaining to his occupation, the phrase "wholly disabled" shall be given a reasonable and practical construction, so as to carry out the spirit of the contract. But if the injury is such as to render him merely incapable of attending to his various duties, or to prevent him from attending to some or parts of them, while attending to other branches of business, he is not wholly disabled.

The United States Court of Appeals, ⁴ Fifth Circuit, rules that **self-destruction means suicide** and not accidental self-killing.

The Supreme Court of Tennessee ⁵ held insurance not to be vitiated if death was due to the use of **drugs, opiates, or alcoholic beverages**, if these were **taken on the prescription** of a physician.

The United States Circuit Court of Kentucky ⁶ says that the **right of insurance companies to examine the body does not extend to dissection**. The word "autopsy" or "dissect" should be inserted in the policy if this is meant.

The Pennsylvania Supreme Court, ⁷ concerning an accident policy reading, "This policy covers **septic poisoning** resulting from accidental incision or abrasion of the cuticle and the simultaneous infection thereof, while the insured is performing a surgical operation or autopsy," held that it was sufficient to show that the deceased died from septic poisoning without showing that the infection occurred during the operation; an objection made on this score was decided to be not well founded.

Contributory Neglect.—The United States Court of Appeals, ⁸ Fifth Circuit, in the case of a person who, after receiving a serious injury in the abdomen, insisted on proceeding on his journey and driving cattle to his ranch, walking 37 miles, and not employing a physician

¹ Rose *vs.* Supreme Order of Patricians.

² City of South Bend *vs.* Turner.

³ Coad *vs.* Travellers' Ins. Co.

⁴ Union Mutual Life Ins. Co. *vs.* Payne.

⁵ Knights of Pythias *vs.* Allan.

⁶ Suddett *vs.* Travellers' Ins. Co.

⁷ Braymer *vs.* Commercial Mutual Accident Co.

⁸ Texas and Pacific Ry. Co. *vs.* White.

for the ten days thus consumed before reaching home, ruled that claim was not to be allowed if the injuries were aggravated by this neglect.

The Supreme Court of Illinois ¹ holds that the liability of a corporation for damages resulting from a defective sidewalk is limited to what was actually due to the injury when it **aggravates an existing disease**—i. e., something more than a mere latent tendency.

The Court of Appeals of Kentucky ² held that a contract that persons dying from **freezing or sunstroke**, if not on duty, only had one-quarter insurance, implies full liability if dying from the same when on duty.

The Supreme Court of Mississippi ³ rules, in the case of a laborer who **lost three fingers** from frost-bite, that he is supposed to assume the risk.

The Vermont Supreme Court ⁴ ruled that claim is not allowed in a case in which the person **fell to the ground before a wagon as the result of a disease**. The crushing of the neck that followed was then wholly the result of the disease.

Administering a Drug to Cause Abortion.—The Supreme Court of Indiana ⁵ holds that the term “administering” is to be used in the widest sense of supplying, furnishing, etc. It is immaterial whether the woman knew the properties of the drug and purposes for which it was used. If he knew or supposed that she was pregnant, and knew the purpose for which she desired the drug, and furnished it to her, and she afterward, when he was not present, took the same, he administered it to her, in the sense of the Indiana statutes.

The Court of Appeals of Maryland ⁶ rules that when death occurs from **criminal abortion** it is murder only when the crime of abortion is a felony. If classed as a misdemeanor, it is only manslaughter. The corpus delicti is really the killing of the unborn infant, and the mother's death is no essential element in the case. Nowadays death is not the result to be naturally expected from abortion.

Nature of Drug Used as Abortifacient Immaterial.—The North Carolina Supreme Court ⁷ decides that if the jury believes that the defendant advised or procured a certain woman to take turpentine with intent to procure abortion, he would be guilty whether it would procure abortion or not. The nature of the drug or article is only material as turning light upon the intent.

The Supreme Court of New York ⁸ holds that it is a provision of the code that no person can be convicted for **rape** on the unsupported testimony of the complainant, and that the testimony of a physician who examined the victim 20 minutes later and certified that she was not a virgin, should not be permitted to be introduced.

The Supreme Court of Minnesota ⁹ decides that in an action to re-

¹ City of Rock Island *vs.* Sharkey.

² Ry. Official and Employees' Acc. Assoc. *vs.* Johnson.

³ Yazoo City Transport Co. *vs.* Smith.

⁴ Clark *vs.* Employers' Liability Assoc. Co.

⁵ Worthington *vs.* State.

⁶ People *vs.* Butler.

⁷ McCaughey *vs.* State.

⁸ State *vs.* Crews.

⁹ Plouty *vs.* Murphy.

cover substantial damages for **miscarriage** following assault, it is not necessary to show that the plaintiff had severe pain, increased illness, or greater impairment of health than if delivery of child had been at proper time and in natural way.

The Appellate Court of Illinois¹ decides that the fact of a miscarriage 2 months after an accident, coupled with physician's evidence that the accident might have caused the miscarriage, and no other cause proved, justify the inference that the miscarriage was the **result of the accident**.

The Supreme Court of Tennessee² rules that **excessive intercourse** furnishes ground for divorce.

Photographs of Injury of Private Parts.—The Supreme Court of Wisconsin³ holds that photographic rear views of a patient's body, made from shoulders to mid-thigh, cannot be exposed in court without gross impropriety in the case of a young girl of 20. Such photographs should be privately examined by experts. Made without leave it would be punishable for contempt.

On a motion for **physical examination** in an action to annul marriage, made in an anonymous case, the Supreme Court of New York holds that the court could compel physical examination where action is taken on the grounds of a disease (syphilis) having existed, but should only resort to it in extreme cases, when other measures are not available. The necessity for the examination should appear in the trial.

Admissibility of Testimony of the Insane.⁴—In the case against a Bellevue Hospital nurse for manslaughter, this question arose. In 1882 the United States Supreme Court stated that a lunatic would seldom be a competent witness, but when afflicted with partial insanity he might be able to give a lucid and clear account of what he had seen, and if, in addition, he was shown capable of understanding the nature of an oath, his testimony might be accepted, the test of competency being left to the court. This is now considered to be less admissible owing to altered views as to partial insanity.

The Supreme Court of Michigan⁵ holds that the presumption is not that an insane man did not commit **suicide**, provided his insanity is of a nature usually attended with suicidal tendencies.

The Kansas Court of Appeals⁶ decides that an **insane person's estate is liable** for necessities. In this case an insane woman, a citizen of Kansas, where her husband and children resided and were able to support her, was admitted as a pauper patient when on a visit to some relatives in New York.

The Supreme Court of Arkansas⁷ rules that insanity **will prevent pronouncement of a judgment** on the individual, on the same principle as it will prevent trial.

¹ *Stabmann vs. city of Chicago*.

³ *Guhl vs. Whitecomb*.

⁵ *Wasey vs. Travellers' Ins. Co.*

² *Gardner vs. Gardner*.

⁴ Editorial in *Medicine*, May, 1901.

⁶ *Palmer vs. Hudson River State Hosp.*

⁷ *State vs. Helm*.

PUBLIC HYGIENE AND PREVENTIVE MEDICINE.

By SAMUEL W. ABBOTT, M.D.,

OF BOSTON, MASS.

THE MANAGEMENT AND CONTROL OF INFECTIOUS DISEASES.

The Transmission of Bovine Tuberculosis to Man.—Koch asserted at the Tuberculosis Congress of 1901¹ that if susceptibility to bovine tuberculosis among men really exists, infection of human beings is of very rare occurrence. He estimated the danger of infection by milk and flesh of tuberculous cattle, and butter made of their milk, as hardly greater than that of hereditary transmission, and therefore did not deem it advisable to take any measures against it. So the main source of infection of tuberculosis is the sputum of tuberculous patients, and measures for the combating of tuberculosis must aim at the prevention of dangers arising from its diffusion. *Per contra*, Newsholme, in his annual report of 1900 for Brighton, England, says: "After making the fullest allowance for errors in diagnosis, the following remarkable and suggestive facts are noteworthy: (a) The death-rate from *tabes mesenterica* has remained stationary, while that from other forms of tuberculous disease has greatly declined. (b) The chief incidence of deaths from *tabes mesenterica* is among infants in the first two years of life, these being the years in which uncooked milk forms the chief item of the child's food. The same fact may be expressed in another form, thus: While only 3.6% of the deaths from tuberculosis of the lungs occur in children under 5 years of age, 78.2% of the deaths from tuberculosis of the bowels occur at these ages. It is impossible to disavow these statistics from the firm belief that while tuberculosis of the lungs is usually due to direct inhalation of infective dust, tuberculosis of the bowels is frequently caused by the drinking of the milk from tuberculous cows. (c) Cows brought into the Brighton slaughter-houses from farms in neighboring districts have frequently been found to be suffering from advanced tuberculosis of different organs, and sometimes from tuberculosis of the udder. (d) Bacteriologic examination and inoculation experiments on animals have proved that frequently cows' milk is capable of producing tuberculosis in other animals. (e) Feed-

¹ Address at London, July 24, 1901.

ing experiments in animals have repeatedly demonstrated the infectiveness of milk derived from tuberculous cows when the udder is implicated in the disease." The unanimous conclusion of the First Royal Commission on Tuberculosis, reported in 1895, may be noted: "Any person who takes the tuberculous matter into the body as food incurs some risk of acquiring tuberculous disease." It appears probable that tuberculosis is conveyed by means of cows' milk only when the tuberculous disease affects the udder. The satisfaction that this statement might otherwise impart is minimized by the following remark of the Royal Commissioners: "It should be noted that this affection of the udder is not peculiar to tuberculosis in an advanced stage, but may be found also in mild cases" (par. 60). Furthermore, "the milk of cows with tuberculosis of the udder possesses a virulence which can only be described as extraordinary" (par. 61). It is also ominous that "the spread of tubercle in the udder goes on with most alarming rapidity." Thus, Prof. Sims Woodhouse remarks (par. 62): "I have noticed on several occasions during the interval between fortnightly inspections, carried on along with a veterinary surgeon, that the disease had become distinctly developed. It may be, of course, that the early evidence has been overlooked at the previous inspection; but whether this is the case or not, the spread of the disease was so rapid as to afford very good ground for alarm. The very absence of any definite sign in the earlier stage is one of the greatest dangers of this condition."

The Thermal Death-point of the Tubercle Bacillus.—The experiments of Russell and Hastings¹ confirm those of Theobald Smith² as to the degree of heat required to destroy the tubercle bacillus in milk. Their results are as follows: (1) An exposure of tuberculous milk in a tightly closed pasteurizer for 10 minutes destroyed the tubercle bacillus, as determined by the inoculation of such heated milk into susceptible animals. (2) When milk was exposed under conditions that would enable a surface pellicle or scum to form on the surface, the tubercle organism was able to resist the action of heat at 140° F. (60° C.) for considerably longer periods of time. (3) Efficient pasteurization can be more readily accomplished in a closed receptacle, such as is most frequently used in the commercial treatment of milk, than when the milk is treated in open bottles or open vats. (4) It is recommended, in order to pasteurize milk thoroughly so as to destroy any tubercle bacilli which it may contain, without in any way injuring its creaming properties or consistency, to heat the same in closed pasteurizers for a period of not less than 20 minutes at 140° F. (60° C.)

Tuberculosis among Cows in Paris.—Duprez³ reports that tuberculosis was detected in 217 out of 1300 dairies in Paris and its suburbs in 1899, or in about 1% of the bovine population. Accord-

¹ Seventeenth Ann. Rep. of the Wisconsin Agric. Exper. Station.

² Jour. Exper. Med., vol. iv, p. 217.

³ Rapport sur les opérations du service vétérinaire sanitaire de Paris et du département de la Seine pendant l'année 1899.

ing to certain regulations published in 1898 and 1899, the owners of animals slaughtered on account of tuberculosis are allowed damages as follows: (1) One-third of the value of the animal at the time of slaughter, if the disease has become extensive; (2) three-fourths of its value when the disease is only local; (3) its entire value when the autopsy shows that the animal was free from disease when ordered to be slaughtered. The value of the meat, hide, and other parts is deducted from the indemnity. Out of 302,000 animals slaughtered in Paris (cows and calves) only 2160, or 0.66%, were found to be tuberculous.

Antituberculosis Dispensaries in France.—Calmette¹ describes a dispensary which he has established at Lille, France, by the aid of public and private subscriptions to the amount of 76,000 francs (about \$15,000). He also says that similar dispensaries have recently been established at Paris, Verviers, Huy, and Mons, and others are contemplated at Arras and at Nantes. He describes in detail the object of the work, its necessity, and the methods of operation. After collecting a subscription of 46,000 francs the city gave the use of a lot of land and contributed a further sum of 30,000 francs for the undertaking. According to Dr. Calmette, very much depends upon the selection of a good assistant, who visits the houses of the sick and makes the necessary inquiries and gives proper instruction. He is provided with a blank form which contains 68 questions as to the habits, necessities, and mode of life of the sick. In this instance the assistant is an old flax-carder and secretary of the Mutual Aid Society. At the dispensary the usual clinical examinations are made, including the bacteriologic examination of sputum. Flasks are provided for the deposit of expectoration, together with a quantity of lysol as an antiseptic. An excellent circular is furnished containing instructions for the sick. Other subjects discussed in this paper are the cleansing and disinfection of the linen of the sick, the medical service of the dispensaries, and the question of sending consumptives to the country to board—which the author discourages unless they can be placed where they may be sure of getting good food and attention, or the advantages of a sanatorium. The number of persons assisted at this dispensary from February 1 to June 1, 1901, was 236, of whom 157 were found to be tuberculous. The total expense for the 4 months was 5711 francs (\$1142) or about \$285 per month. This includes the wages of the assistant, the cost of the pocket-flasks, disinfectants, etc. The medical services were gratuitous. For an account of a similar establishment at Liege, by E. Malvoz, see also "*La Presse Médicale*" (March 2, 1901, p. 97). The account shows that the dispensary has proved highly successful.

Tuberculosis and Marriage.—Massolongo,² of Verona, states certain measures which, in his opinion, should be taken to prevent the production of tuberculous offspring. He advises the widespread distribution of information upon the subject of the danger of marriage of

¹ Rev. d'Hyg., vol. XXIII, p. 577, July, 1901.

² Giorn. della R. Soc. Ital. d'Igiene, Aug. 31, 1900, p. 337.

tuberculous persons as well as of extremely early marriages; also the necessity, when such marriages occur, of rendering them sterile, of removing from the domestic fireside the offspring of such marriages, as a matter of safety, and of keeping careful watch of such children till they have passed the period of puberty.

Existence of Tuberculosis at Different Ages.—Nägeli¹ found at the Pathological Institute at Zürich, as the result of 500 autopsies, no traces of tubercle in 16 infants under 1 year of age, 12 of whom were newborn. From 2 to 5 years it is rare, but fatal when it occurs. From 5 to 14, one-third of the bodies showed tubercle. From 14 to 18, half the cases were tuberculous. From 18 to 30, nearly every body showed marks of the disease, but in one-fourth healing had occurred. All the bodies over 30 years of age showed alterations due to tubercle, but in the majority of these the healing process was complete, the proportion of "cures" increasing with the age. It would appear that after 30 years' existence every one (in the neighborhood of Zürich) had been more or less successfully attacked by *Bacillus tuberculosis*; but from the fact that not more than 1 in 6 or 7 dies of the disease, and that most of these are under 30, one may conclude that the adult body is, as a rule, well able to resist the attack.

Action of Sunlight on Tuberculous Sputum.—Jousset² records some experiments made in order to determine the vitality of *Bacillus tuberculosis* in sputum, after exposure to direct and to diffused sunlight. Dried sputum, after 4 hours' exposure to diffused sunlight, no longer infected guinea-pigs, though the same sputum without such exposure was capable of producing typical tuberculosis on inoculation. Another specimen of sputum, after an exposure of 7 hours to diffused sunlight, produced only a localized tuberculous ulcer at the seat of inoculation, without any general infection such as was produced by another portion of the same sputum which had not been exposed. Sputum, the virulence of which had been tested, was rendered innocuous after drying and exposure to direct sunlight for 1 hour. The results show that tuberculous sputum when dried in sunlight is either harmless or, at least, has its virulence attenuated by shorter exposure to sunlight than previous experiments had led us to suppose.

Persistence of *Bacillus Diphtheriæ*.—Prip,³ of Copenhagen, found bacilli persistent in the secretions of 309 out of 684 patients in the hospital, after the disappearance of the membrane, for the following periods:

In	118	from	1 to	10 days.
"	93	"	10 "	20 "
"	51	"	20 "	30 "
"	41	"	30 "	60 "
"	4	"	60 "	90 "
"	2	"	90 "	120 "

¹ Hyg. Rundsch., 2, 1901.

² Compt. Rend. de la Soc. de Biol., Nov. 2, 1900, p. 488.

³ Hospitalstidende, Feb. 27, 1901.

Among 100 convalescents, bacilli were found in 60 after discharge from the hospital, and persisted for the following intervals :

In 13	for less than	1 month.
" 20	" more "	1 "
" 11	" " "	2 months.
" 6	" " "	3 "
" 5	" " "	4 "
" 2	" " "	5 "
" 1	" " "	8 "
" 1	" " "	11 "
" 1	" " "	22 "

Various remedies were used to get rid of the bacilli, but all with doubtful effect. An intercurrent attack of another infectious disease appeared to produce the best result.

The Utility of Isolation Hospitals in Diminishing the Spread of Scarlet Fever.—Newsholme¹ shows that, if death-rates are to be considered as conclusive, the returns relating to scarlatina "show a strong case for the continued use of the present preventive measures, among which hospital isolation and disinfection claim an important part." He shows that in the period 1850 to 1885 the death-rate had been extremely irregular, rising frequently to a very high rate and then sinking to a very low one, as, for example, from 451 per million in 1861 to 1478 per million in 1863, and down again to 546 in 1866. But since 1885 the mean rate had not only been low, but it had been quite uniform and free from extremes from that time to the present. He concludes that "preventive measures, among which hospital isolation holds an important place, have been associated with the remarkable and almost uninterrupted decline in the death-rate from this disease." The reasons which he assigns for the fact that an ideal condition has not yet been attained are briefly the following: (1) Hospital and home isolation have never been perfectly carried out. (2) Not only have a considerable proportion of the notified cases remained unisolated, but a considerable proportion of the total cases have not been notified. This is due to various causes, such as failure to call in medical aid in slight or unrecognized cases, errors in diagnosis, and neglect to notify. Every additional case notified gives an additional opportunity for preventing the spread of the disease by personal infection; and every such notified case can be made a center of inquiry leading to the detection of unnotified cases if sanitary administration be active and intelligent. (3) The best sanitary administration cannot accomplish everything. There must be hearty cooperation on the part of parents and medical practitioners if efforts to secure early diagnosis and early isolation are to be successful.

The Identity of Variola and Vaccinia.—Farrar,² after reviewing the numerous authorities upon the bacteriology of variola and vaccinia, sums up the question as follows: "Finally, we may now take it that the pathogenic identity of vaccinia and variola has been proved by the

¹ Jour. of Hyg., vol. I, No. 1, p. 145, Jan., 1901.

² Public Health, July, 1901, p. 660.

experiments of several workers. Klein's work on this subject is quite convincing. He clearly showed that lymph originally derived from vesicles of human variola and transmitted through calves would produce typical vaccinia vesicles in calves and typical vaccinia in the human subject, the result being constant through several removes, and the calves so treated being insusceptible to vaccination with current calf-lymph."

Vaccination in Germany in 1898.—Burkhardt¹ gives the following statistics of vaccination in Germany in 1898: The whole number of children vaccinated was 1,480,810. The revaccinated were 1,195,205. The ratio of success was, for vaccinations, 97.15%, and for revaccinations 91.79%. Animal vaccine was almost exclusively employed, the ratio being 99.96%. Vaccinations direct from the heifer to the arm have been generally abandoned. Resistance to vaccination, was greatest in Magdeburg, Oldenburg, and at Bremen, as also in previous years in the same localities. In some localities the antivaccinationists had maintained a lively campaign, the mothers occasionally washing away the inoculated lymph with saliva, or sucking it out with their mouths. In one case in which this was practised the child had multiple abscesses of the arm, and this was published by the antivaccinationists as an instance of disease caused by vaccination.

Vaccination in Herzegovina and Bosnia.—Following the occupation of these districts by Austrian troops smallpox had become seriously epidemic among the population. Continuous vaccination was resorted to from 1887 to 1898, until a very large share of the population had become immunized. The result was a diminution of the prevalence of smallpox from 30,867 cases in the 5 years 1887 to 1891 to 303 in the 5 years from 1894 to 1898, or less than a hundredth part. Karlinski² therefore concludes: (1) That the decrease in smallpox during this period was due to the immunization of the people by vaccination; (2) that, in consideration of the fact that in neighboring countries where vaccination is neglected smallpox still continues its inroads upon the people, the freeing of Herzegovina and Bosnia from this pest may be credited to vaccination. The reviewer commends the example of this country to the attention, not only of other lands where vaccination is neglected, but also to the careful consideration of the antivaccinationist fanatics.

Protection against Malaria in Italian Marshes.—Fermi and Cano-Bruseo³ detail the results of experiments made to show the effect of protecting the naked parts of the body (face and hands) against the bites of mosquitos by the use of gloves and veils. Sixteen healthy men, of 16 to 30 years of age, volunteered for the experiment, and 10 of these were protected with the gloves and veils, while the remaining 6 were unprotected. These men were taken every evening to a hut near some marshes in Liccari, where *Anopheles* was known to be abun-

¹ Med. statistische Mittheil. aus dem kais. Gesundheitsamte, 6, 1901, S. 265.

² Bericht über die Impfungen in Bosnien und der Herzegovina und den Einfluss derselben auf das Vorkommen der Blatter im Lande, 1901.

³ Annali d'Igiene Sperimentale, 1901, f. 1.

dant. Of the 10 protected persons not one was taken ill, while 5 out of the 6 unprotected men contracted malaria.

Malaria in Relation to Engineering and Agriculture.—Prof. A. Celli has contributed a paper to the “Journal of the Sanitary Institute,” January, 1901, page 617, from which the following selections are made: “(I) The larvæ of *Anopheles* live in the water, clean or foul, clear or turbid, acid or alkaline, and ferruginous. They do not live in (1) water containing salt (salt marshes, sea water, and mixtures of that with fresh water in the proportion of two to one), (2) very strong sulphur waters, or (3) water that is putrid from the putrefaction of animals or textile plants. They avoid (1) water in which there is any movement (currents, rippings caused by even light winds such as sea breezes, or mechanical disturbance, as by the passage of boats), and (2) water without vegetation of aquatic plants, of which they prefer the filamentous species, which do not occupy the whole free surface of the water, where they rise to breathe. (II) The aerial *Anopheles* are little domestic animals which live in and around houses. It is on this account that malaria is so often epidemic—that is to say, a disease which is contracted for the most part in the interior of dwellings, or in their vicinity. They bite in the evening and at night, and from olden times, therefore, these have been looked upon as the most dangerous hours for the contraction of fevers. The insects are carried to a distance, not only by the wind, which they dread because they are beaten down by it, but passively—that is to say, on man, on his belongings (grass, hay, wood, beasts), and on his means of locomotion (carts, coaches, railway carriages, etc.). From these facts, which are now thoroughly established, are deducible several corollaries useful in practice for engineers and agriculturists: (A) *Corollaries for Hydraulic Engineers*: In the first place, certain prejudices that have for a long time held sway in the schools have been definitely removed. For instance, it can no longer be maintained that a puddle or lake is improved by the water level being kept constant. On the contrary, if the waters are still and, as happens in the neighborhood of the edges, there grows an aquatic vegetation, there the larvæ of *Anopheles* gnats mostly make their nests. Another prejudice, already combated by Tommasi-Crudeli and now definitely buried, is that putrid waters and the emanations therefrom are causes of malarial fevers; whereas, on the contrary, it has been seen that the specific gnats do not live in stinking waters. Another prejudice which is already crumbling away, although the Paris Academy of Medicine not long ago attempted to revive it, is that waters which are brackish, owing to a mixture of fresh water with sea water, and salt marshes along the sea-coast are very unwholesome. Having thus briefly seen which are the gnat-breeding, and therefore the malaria-breeding waters, I pass on to indicate the new criterions with which engineers who have to carry out hydraulic improvements designed to free districts from malaria should be acquainted. It is known that these improvements can be secured by means of (a) natural drying by large canals with a high-level watercourse; (b) mechanical drying by means of pumping engines;

(c) earth embankments; (d) drainage. This last method may be sufficient of itself or may be complementary to those previously mentioned.

(B) *Corollaries for Sanitary Engineers*: The house in malarial regions may, as has been said, be the point of greatest danger from fevers, while, on the other hand, if properly built and equipped, it may be the safest place. Formerly, in every malarial district it used to be required (and as far as possible it ought still to be required) that the house should be built in the highest and driest situation possible; but this is not sufficient, for the gnats, directly or passively, will get up to it. Other structural conditions are to-day more necessary whenever a house has to be built in a malarial place. Above all, there should never be a dark or badly lighted part in the house. If there is such a part, as for example in the cellars, under the stairs, in the latrines, gnats will certainly hide there. The walls of the rooms must be white, so that every gnat that rests on them may at once be seen. From the bedrooms it will be necessary to remove pictures, curtains, and such articles of furniture as shelter gnats. If by chance one is heard in the night, a powder should be burnt, which at any rate will stupefy it, so that afterward, in the morning, it can be looked for and killed. Care should be taken that there are no holes in the floor, or, if there be any, that they should be closed. It is advisable to avoid having trees about the houses, as in the daytime the mosquitos hide there, which in the evening try to make their way into the houses, especially into rooms where there is a light burning. Finally, any kind of habitation in a malarious place, even temporary sheds that can be taken down and straw huts, should be protected against the invasion of mosquitos. The walls should be of netting, or be made somehow impermeable to those insects, and in every case a cage with an outer and an inner door of metallic netting should protect the entrance. With such mechanical protection I last year, for the first time, made it possible for the families of railway servants to pass the whole summer and autumn in the most malarious spots of the Campagna without contracting the fever; and there is no longer any doubt that it is possible to keep a house free from mosquitos, and therefore from malaria, in the regions most infected by that epidemic disease.

(C) *Corollaries for Agriculturists*: It must first of all be understood that any turning of the soil cannot by itself be a cause of malaria, as was believed when it was supposed that the germs of this infection lived in the ground. Thus the temporary irrigations of dry cultures, as maize, meadows, fields, pot-herbs, oranges, lemons, etc., cannot be a cause of malaria, provided the water reaches the soil in no greater quantity than it does in a shower of rain, and the canals by which it flows in or out are not of such a character as to allow it to become stagnant. On the other hand, marsh lands or irriguous fields which are kept in a state of prolonged submersion may be a cause of malaria, not by reason of the water which is poured over the fields, and during the fever season is not left there, but by reason of the water which stagnates in the canals around the square patches of meadow."

The Prophylaxis of Malaria on the Island of Asinara.—The

island of Asinara, to the north of Sardinia, is used as a convict station, and before Fermi and Tonsini¹ undertook their experiments they made a survey of it in order to ascertain the localities in which malaria was more or less prevalent; to obtain a record of marsh-waters, stagnant pools, cisterns, wells, and water-tanks; to note the superficial area and depth of the different collections of water; to record the temperature, flora, and insect fauna of these different waters, and to localize the presence in them of the larvæ of *Culex* and *Anopheles*. The results of this survey are here set forth. There were 11 districts in which malaria was prevalent, 6 in the south and 5 in the north of the island, and the water area amounted to between 700 and 800 square yards. Nine of the ponds and seven tanks contained gnat larvæ, and these larvæ were all destroyed by the treatment of the water with petroleum, which was begun in June and ended in November. The mosquitos in the houses were exterminated by the various insect powders of Bertram and others, and the dormitories of the convicts were submitted daily to the action of chlorin gas derived from a mixture of calcium chlorid and sulphuric acid. The mode in which this was effected is described, and it is stated that both *Anopheles* and *Culex* were practically banished from the rooms. As a result of this treatment no single origination case of malaria was authenticated. Of the 9 cases, 3 were imported and 6 were relapses. In the year previous to this investigation there were 99 cases, about 40 of which were developed on the island. The authors state that the island of Asinara is peculiarly well adapted for experiments of this kind.

Investigations with Respect to Spray-infection.—It is pointed out that, thanks to the researches of Flügge, great changes have recently taken place in the opinions prevalent concerning the spread of infection in the atmosphere. Within the past two years he has explained the agency of minute particles of dust in the transmission of disease-germs, and he has since called attention to the possibility of conveying infectious matters through the air by means of minute drops of moisture. Flügge has, moreover, proposed the term "spray-infection" (*Tröpfchen-infection*) for this process, and by a series of careful experiments he has not only shown that germs may thus be disseminated, but he has also ascertained the strength of the air-currents needed to convey these minute germ-laden particles of moisture to a distance. It occurred to Koeniger² that on the lines of similar experiments already carried out by Flügge and his pupils it might be of advantage to ascertain, by the institution of practical tests, how far it was possible by means of sneezing, coughing, or conversation, either in low or in loud tones, to spread abroad in the atmosphere of inclosed spaces the minute organisms which constitute the infectious matters in various diseases. For this purpose he prepared cultures of certain easily recognized bacilli, not likely to be present in the atmosphere, and rinsed his mouth with them in rooms in which numerous gelatin plates, suitable for the growth of bacilli, had been exposed at various distances from the speaker. He then carried out a

¹ Zeit. f. Hyg., 1900, S. 534.

² Zeit. f. Hyg., Bd. XXXIV, 1900, S. 119.

series of tests of coughing, sneezing, whispering, and speaking, and ascertained the number of colonies which appeared on the test-plates at each distance and after various periods of time. The results of these experiments, in which, for reasons explained, *Bacillus prodigiosus* and *Bacillus mycoides* were employed, are set forth in a series of tables. Diagrams are also given of the rooms in which the experiments were conducted. In some instances strict precautions were taken to avoid drafts and movements in the atmosphere, and in others air-currents were artificially induced. It appeared that the period during which the moist particles of spray may remain suspended in the atmosphere varies considerably, but in the case of the prodigiosus germs it rarely exceeded 10 minutes. Sundry conclusions arising from these experiments are set forth by the author, and the importance is urged of abstaining from sneezing, coughing, and loud conversation in hospitals and in operating-rooms.

The Increase of Cancer.—Maeder¹ estimates that the present increase of cancer in Germany, if continued to the end of the century, would give a death-rate of 22 per 10,000, which is the present mortality of tuberculosis of the lungs in Germany; and if by that time the death-rate from tuberculosis shall have been reduced to 5 per 10,000, the destructiveness of the two diseases will have been reversed. In general the cancer mortality in the towns is twice as great as that in the country (7.9 and 3.8), and the relative mortality of large cities from this cause is greater than that of small ones. Whitney,² after reviewing the statistics of cancer mortality of Massachusetts and other New England States, also that of Michigan, and of England and Austria, publishes the following conclusions: (1) If death from cancer should go on at the apparent geometric rate of increase of the past 50 years, in 2½ centuries every person over 30 years would die from that disease. (2) This rate is probably only arithmetical at its worst. (3) The increase is probably due to better diagnosis and registration, and until the ratio of deaths over 30 years has reached 8% to 9%, which is shown by autopsies to be the true rate for cancer, it is not justifiable to speak of the increase as inherent in the disease itself. (4) For purposes of comparison with other places or years, a “graphic picture,” composed of both the death-rate and the percentage of the total mortality curves, covering a period of 30 years, divided into decades, is the best.

Viability of *Bacillus Pestis*.—Rosenau³ presents the results of experiments to determine the viability of *Bacillus pestis*. These included experiments upon Chinese dried food-products, water, the effect of temperature, moisture, sunlight, soil, clothing, mail matter, and the action of disinfectants and antiseptics. The following conclusions are published: (1) *Bacillus pestis* is not a frail organism. It resembles the hemorrhagic septicemic group, or the coccobacilli so far as its viability is concerned. (2) Temperature is the most important factor in

¹ Zeit. f. Hyg., 33, S. 235.

² Shattuck Lecture, Tr. Mass. Med. Soc. for 1901.

³ Bull. No. 4, Hyg. Laboratory, Washington, 1901.

the viability of the plague bacillus. It keeps alive in the cold (under 19° C.) a very long time. It dies quickly, especially when dried, at the body temperature (37° C.). (3) Moisture favors the life of *Bacillus pestis*. It usually dies in a few days when dry, even in the presence of albuminous matter, provided the temperature is above 30° C. It may keep alive and virulent, when dry, for months in the cold, under 19° C. (4) Sunlight kills the organism within a few hours, provided the sun shines directly upon the organism and the temperature in the sun is over 30° C. The effect of sunlight is not very penetrating. (5) The virulence of *Bacillus pestis* is often lost before its viability. (6) It is unlikely that new dry merchandise would carry the infection. The organism usually dies in a few days on the surface of objects such as wood, sawdust, bone, paper, etc. (7) Clothing and bedding may harbor the infection for a long time, and may act as fomites. The bacillus lives for months, when dry, in albuminous mediums at a temperature under 20° C. (8) Food-products may carry the infection of plague. The bacillus lives a long time in milk, cheese, and butter. It usually dies quickly on the surface of fruits and prepared foods. (9) The organism may live a long time in water, although plague is not a water-borne disease. (10) The plague bacillus does not live long on paper, and first-class mail is, therefore, not apt to carry the infection. (11) The colder the climate, the greater the danger of conveying the infection by fomites,—clothing, bedding, food, merchandise, etc.,—and more extensive disinfection is required in such a climate in combating the disease than in tropical regions. (12) The plague bacillus is destroyed by sulphur fumigation and by formaldehyd gas in the strength in which these disinfectants are usually employed. These gases can only be depended on as surface disinfectants. In disinfecting ships, warehouses, dwellings, and other places infected by rats, fleas, and vermin, sulphur is better than formaldehyd, because the latter fails to kill the higher forms of animal life. (13) A temperature of 70° C., continued a short time, is invariably fatal for the plague bacillus. The ordinary antiseptics are all efficacious in their usual strength for non-spore-bearing organisms. Efficient surface disinfection may be accomplished by exposing objects all day to the direct sunshine on warm days. The temperature in the sun must be above 30° C. In continuation of the same subject, Geddings,¹ experimenting upon dried Chinese food-products, concludes that it is unlikely that these products can convey the germ of plague, even should they become contaminated with the same. Under the ordinary conditions of commercial intercourse, he questions whether such contamination is likely to occur, or whether, in the presence of the temperature obtaining in the holds of ships, the organism would have any prolonged life.

Ship-borne Rats and the Plague.²—The Local Government Board of England has issued a circular recommending the destruction of all rats upon incoming vessels on which the plague has occurred, or has been suspected, and that strict inquiry should be made as to the

¹ *Loc. cit.*

² Circ. Letter of Local Govt. Board, England, May, 1901.

mortality among rats upon vessels coming from plague-infected ports. If, by experiment, such rats are found to be infected with plague, such vessels are to be dealt with as in the case of others upon which plague is known to have occurred. Rats on shipboard are not to be handled when destroyed, but must be cremated. All parts of the vessel frequented by rats are to be disinfected when such animals are found to be infected. Authorities of seaport towns are recommended to destroy all rats in their towns and to prevent their gaining access to departing vessels. "Public Health"¹ thinks these instructions too lenient, and believes that all vessels coming from infected ports should be similarly dealt with, whether infected or not.

The Influence of Germ-free Food and Air on Animal Life.—Schotelius² rendered the outside of eggs aseptic, and, having incubated them in an aseptic chamber, was able to rear a certain number of chickens in this way. Nuttall and Thierfelder³ similarly reared young animals which had been removed from their mother by cesarean section. In either case the experiments showed that such animals or birds brought up in germ-free surroundings flourished less vigorously than those kept under similar conditions, except that the free access of bacteria in the air and food was permitted. Charrin and Guillemonat⁴ have also tested the influence of sterile air and food on adult animals. Guinea-pigs were kept in cages which had been thoroughly sterilized; all air admitted to them was freed from bacteria by filtration, and all food was sterilized by heat. The skin and mucous membranes of the animals, when they were first introduced into the cages, harbored, of course, the usual bacteria; but under the new conditions the number of such bacteria soon diminished considerably, and the vitality of such as persisted was lowered. Especially was this so in the case of the normal intestinal bacteria, many of which appear to have their vitality lowered by the action of the digestive secretions and mucus, while under the conditions of the experiments the waste of those thus dying could not be made good by others ingested with the food. Control animals were kept under exactly similar conditions, save that no aseptic precautions were taken. In order that any impairment of the value of the food by the preliminary heat-sterilization might tell equally in both series, the food of the control animals was first sterilized by heat and then freely exposed after cooling. Out of 27 animals supplied with sterilized air and food, 19 died in the course of the experiment, which lasted over 5 months. Out of 29 control animals only 10 died, the mortality in either case being probably influenced by want of opportunity for sufficient exercise in the cages. The average daily loss in weight in the experimental animals was 14.1 grams, and in the control animals 12.2 grams. The ratio of nitrogen excreted to nitrogen ingested was, in the case of the experimental animals, slightly higher than in the control animals; the differences, like those in the daily loss of weight, were not excessive, but were constant

¹ July, 1901, p. 658.

² Public Health, June, 1901, p. 654.

³ Public Health, June, 1901, p. 654.

⁴ Compt. Rend. de l'Acad. des Sci., 132, p. 1074, 1901.

in a considerable number of experiments. In order to test the resistance of the two sets of animals to injurious bacteria, a number were inoculated with equal doses of a culture of *Bacillus pyocyaneus*, of a rather low degree of virulence. Of the animals supplied with sterilized air and food, 6 out of 9 inoculated succumbed; while, of the control animals, only 5 out of 11 inoculated were lost. The experiments, on the whole, appear to show that current opinions as to the utility of the normal bacteria of the intestinal tract are well founded, and that when the number and activity of these are diminished, the vitality of the organism suffers.

Experiments with Anthrax Disinfection as Applied to Horse-hair Packed in Bales.—The recent experiments of Webb¹ in London resulted in failure. The bales weighed about 5 hundredweight. The first experiment was made with a tightly packed bale, not cut open, but subjected to steam at a temperature of 240° F. The bale remained in the steam chest for a half hour, and subsequent examination showed that anthrax germs were still present in large quantities in the middle of the bale. Another bale was penetrated by a hole extending to the center, and after an hour's exposure showed that "the recorded temperature was at least 40° below that at which there would be any certainty of anthrax spores being destroyed." After many trials, Mr. Webb says: "I must admit that, at the present, I can hardly urge upon my friends in the hair trade to go to the expense of steam disinfectors; while they undoubtedly minimize the risks, my own experience leads to the belief that they are not completely efficient."

Felons in the Army.—Deeleman² comments upon the frequency of felons among soldiers, and attributes this frequency mainly to want of cleanliness of the hands while cleaning their muskets and cooking utensils, and to the rancidity of the fat used for oiling. This fat or grease, becoming old, is infected with numerous microorganisms, many of which are pathogenic, and a slight scratch may lead to local infection. For the purpose of prevention he recommends: (1) For use in the barracks, sand-soap and nail brushes for cleansing the hands of the cooks. (2) Sterilization of the fat or grease used for oiling firearms, and its frequent renewal and preservation in hermetically sealed cases from which the light is excluded.

FOOD, DRINK, AND POISONS.

The Hygiene of Bread Manufacture.—Waldo and Walsh³ suggested two methods by which a loaf of bread might convey specific organisms capable of causing injury to consumers: (1) Organisms that have lodged on the crust of the loaf from surface contamination in an infected bakery; (2) organisms that have possibly escaped destruction in the interior of the loaf during the process of baking. The authors

¹ Ann. Rep. of Chief Inspector of Factories and Workshops, London, 1901.

² Deut. militärärztliche Zeit., Feb., 1901.

³ Bread, Bakehouses, and Bacteria, London, 1901.

carried out a series of experiments to determine the second of these possible modes of infection. *Experiments upon Temperature:* (1) There is an average temperature in the middle of an ordinary quarter loaf of 75° to 86° C. (163° to 187° F.), and in smaller loaves of 86° to 95° C. (187° to 203° F.). (2) There is a steady increase in the temperature in the middle of a loaf during the baking. The highest of these temperatures are only maintained for a short time, and are not high enough nor maintained for a sufficient time to destroy all bacilli and their spores. Loaves were obtained from different bakeries in London, and examined by direct microscopic examination and by cultivation. The former method proved unsatisfactory, while the latter, under two methods of examination, yielded 13 species of bacteria from 62 loaves of bread. These were nonpathogenic organisms. The authors argued that if these could survive the heat of baking, certain pathogenic forms might pass the same ordeal. In a later chapter the statement is made that the cholera bacillus has been cultivated from bread made of dough infected with a pure culture of that organism.

The Milk-supply of London.—A writer in the "British Food Journal" ¹ estimates that the quantity of milk required to meet the wants of London during 12 months reaches the enormous total of 51,840,000 gallons, or about 142,028 gallons a day; more in summer, less in winter; "the milkmen in the poorer districts of London doling out the precious liquid food in such small quantities that the smallest coin of the realm as regards its face value has to be employed in payment for the same." The same writer estimates the amount necessary to supply the yearly total for the United Kingdom at 473,652,980 gallons.

New Milk Standard in England.—The Department of Agriculture has established a new standard of milk, ² which went into operation September 1st. This regulation makes 3% the standard of milk fat, and 8.5% for the solids not fat.

The Injurious Action of Boron Compounds.—Grünbaum ³ criticizes the conclusions of Rosenheim and Tunncliffe as to the influence of boric acid and borax in the human subject. Each of these, he says, has a distinctly inhibiting action on the rennet ferment, if added in proper solution. This must be expected, because insoluble calcium borate is formed. To neutralize this effect, not merely a "small quantity," but at least an equivalent quantity, of calcium chlorid must be added. In order not to destroy the effect of the borax, calcium chlorid can only be added to the drugged milk just before consumption. Although it is correct that no erythematous rashes have been recorded through taking borax for food, the authors have omitted to mention the far more important fact that other more serious toxic effects, which could hardly have been due to anything else, have been recorded as the result of taking milk drugged by the dealer with borax. The quantities of borax given were certainly much less than that required to inhibit bacterial growth in milk, and less than that required to

¹ Sept., 1901.

² Sanitary Rec., Sept. 12, 1901.

³ Brit. Med. Jour.

preserve milk for 24 hours in summer. The question of harmfulness or otherwise can only be judged from general considerations. It is impossible to judge, from an experiment of 2 or 3 weeks' duration, whether taking a drug over a lengthened period, especially in infancy, may not affect the length of a man's life. Since, therefore, we cannot make conclusive experiments, we must make deductions from known facts. There is no reason to suppose that any organic or inorganic substance which will injuriously affect a cell like a bacterium does not also injure the cells of the alimentary canal. The repair of these injured cells throws a strain on the injured organism which it would not have had without the addition of the preservative to the food. The fact that the commonly employed antiseptic preservatives are rapidly eliminated by the kidneys, either unchanged or only slightly changed, is, he thinks, the most conclusive evidence of their poisonous character. It throws an uncalled-for burden on the normal kidney, and, when the kidney is no longer normal, may be positively dangerous.

Death Due to Lead in Beer.—An instance is reported,¹ which occurred in Glamorganshire, England, of a fatal case of lead-poisoning from the following cause: A workman, who went to his work early in the morning, drank each morning a glass of beer at a certain public house, receiving beer which had been in contact with lead pipes over night. The patient died, as was believed, of lead-poisoning. A sample of this beer gave abundant evidence of the presence of lead.

Arsenical Poisoning from Beer-drinking.—One of the most disastrous epidemics of arsenical poisoning ever reported was in progress in England during 1900, and has become the subject of two reports, one of the Local Government Board, dated February 7, 1901, and the other that of the Royal Commission² appointed to investigate the same subject. Attention was first called to the subject by the increasing number of cases of peripheral neuritis which appeared at the hospitals of Manchester, England, and in neighboring towns, many of them proving fatal. The number of such cases in Manchester alone amounted to more than 3000. These were at first thought to be of alcoholic origin, but closer investigation, with analyses of the beer in general use in that locality, together with autopsies, examinations of excreta, etc., showed that the true cause was the presence of arsenic in the beer. The source of this arsenic was found to be the glucose used in place of sugar in the brewing. This glucose was obtained from one manufacturer, who bought his sulphuric acid (used in making the glucose) from a dealer who employed pyrites for the making of the acid, these pyrites usually containing considerable quantities of arsenic as an impurity. These parties, the firms which produced the acid and the glucose, are now in court in order to settle the question of responsibility, suits for damages having been entered against the brewers, and

¹ Brit. Food Jour., Feb., 1901, p. 45.

² First Rep. of the Royal Commission Appointed to Inquire into Arsenical Poisoning from the Consumption of Beer and Other Articles of Food and Drink. Part I, London, July, 1901.

they in turn suing the glucose manufacturer. ' In the Parliamentary report the Committee published its conclusions under the following heads: (*a*) The extent of recent exceptional sickness and death in England and Wales attributable to poisoning by arsenic; (*b*) the cause of this recent epidemic; (*c*) certain medical and toxicologic aspects of the epidemic; (*d*) arsenic in beer previous to this epidemic; (*e*) ways in which arsenic is liable to gain access to beer; (*f*) arsenic-free beer; (*g*) arsenic in articles of food and drink other than beer; (*h*) administrative considerations. Eighteen sittings of the Committee were held and 54 witnesses examined, chiefly physicians, chemists, and brewers. It was shown that samples of the glucose which had been used in making the beer contained from 0.56 grain to as much as 9.17 grains of arsenic per pound. The sulphuric acid used in making the glucose contained from 1.4% to 2.6% of arsenious oxid, while the beer in question contained from $\frac{1}{4}$ grain to 3 grains per gallon. The persons who suffered most were heavy drinkers, often using a gallon a day each, and occasionally 2 gallons. The recommendations of this Committee related chiefly to the best method of future prevention, for which purpose they advised that power be given to the Board of Inland Revenue to "specify in detail individual ingredients of beer which are liable, from their origin and mode of preparation, to be contaminated with arsenic; to prescribe for every such ingredient, and for the different materials used in their preparation, an adequate test which should insure their freedom from arsenic; and to prohibit, under penalty, the use in a brewery of any material which infringes the prescribed test."

The Solvent Action of Certain Waters upon Lead.—In its report for the year 1898, the Massachusetts State Board of Health presented the results of certain experiments which were made with a view to determining the solvent action of certain waters upon lead. Further experiments¹ have been made in the same direction, with reference to which the chemist says: "Many laboratory experiments during the past 3 years have shown that, while pure soft water itself, especially when containing some dissolved oxygen, actively attacks lead, and while the presence of coloring matter, free ammonia, nitrates, and nitrites in soft water also causes considerable solvent action upon lead in laboratory experiments, yet, taking into consideration the results of our entire investigation, we find that in actual practice, with the conditions prevailing under which the water finds itself in a distribution system, a potable water in Massachusetts, to have any dangerous lead-dissolving action, must contain considerable free carbonic acid."

Arsenical Poisoning and Its Relation to So-called Alcoholic Paralysis.—Kelynack² comments further upon the frequency of multiple neuritis in Manchester and its vicinity as compared with other places. Out of 11,943 in-patients at the Royal Infirmary during the 9 years 1892 to 1900, 192, or 1.6%, were cases of multiple neuritis. Comparing the experience of Manchester with that of other districts, he

¹ Thirty-second Ann. Rep., 1900, p. 487.

² Med. Mag., London, July, 1901, p. 396.

finds that peripheral neuritis is far more common at Manchester than it is in London and in other places. Buzzard¹ analyzed 108 cases found among the patients at the National Hospital for the Paralyzed and Epileptic, London, and states that "the cases of peripheral neuritis used for these statistics are those in which there is little or no doubt that alcoholic excess was at any time the chief causal factor." Osler,² of Johns Hopkins University, states: "In reality we see very little severe alcoholic neuritis, and it is in my experience, I think, entirely in whisky-drinkers. I do not remember at the moment ever to have seen in this country a case of alcoholic neuritis from beer." In summing up the evidence from different places, Kelynaek concludes: "A recognition of such facts seems to suggest that much of the so-called alcoholic paralysis met with in Manchester during recent years has really arisen from the use of arsenicated beer."

The Presence of Lead in Common Salt and in Calcined Magnesia.—Maljean³ reports that he has examined samples of common salt which had every appearance of being of the best quality, the sodium chlorid being 99.74%, but on testing it an immediate brownish coloration was given with sulphureted hydrogen, showing the presence of sulphate of lead in the proportion of 13.7 parts per 100,000. This quantity is capable of producing serious lead-poisoning if such salt is used daily in ordinary doses. The author attributes the presence of lead in the salt to the use of copper vessels coated with tin, for evaporating the salt solutions. This tin coating he found to contain much more lead than the allowable limit established by the Consulting Committee of Hygiene of France (3%). By experimenting with plates of lead in hot and cold baths of salt solutions he found that the leaden sheets weighing about 20 grams lost from 4 to 19 milligrams, the immersion being continued from 2 hours to 10 days. He also found an amount of sulphate of lead equal to 0.015 grain in 100 grains of calcined magnesia. The danger of poisoning here, however, is very much less in consequence of the rarity of its use when compared with that of common salt.

Effect of Lead-poisoning upon Pregnancy.—A certifying surgeon⁴ under the English Factory Acts presents the following data in regard to married women employed in lead industries. These data relate to the number of children born, the number who had died, and the number of miscarriages, (1) previous to employment in lead industries, and (2) during or after such employment. The percentage of children who died to the total number born is greater, and the percentage of miscarriages to the total number of pregnancies is less, in the period before lead employment than in the period of lead employment.

¹ *Loc. cit.*, p. 492.

³ *Arch. de Méd. Militaire*, Mar., 1901, p. 211.

² *Loc. cit.*, p. 404.

⁴ *Ann. Rep. of the Chief Inspector of Factories and Workshops for the year 1900*, London, 1901.

PREVIOUS TO LEAD EMPLOYMENT.

NUMBER OF WOMEN.	CHILDREN.		PREGNANCIES.	
	BORN.	DIED.	TOTAL.	MISCARRIAGES.
239	453 100	183 40.4	487 100	34 7

DURING OR AFTER LEAD EMPLOYMENT.

NUMBER OF WOMEN.	CHILDREN.		PREGNANCIES.	
	BORN.	DIED.	TOTAL.	MISCARRIAGES.
239	499 100	182 36.5	566 100	67 11.8

Poisoning by Arseniureted Hydrogen.—Clayton ¹ reports 10 cases of poisoning by arseniureted hydrogen caused by the manufacture of zinc chlorid, by treating zinc oxid with hydrochloric acid. There were 10 cases, and 1 death. The symptoms in one typical case were a feeling of weakness, nausea, burning pain in the esophagus, with intense thirst. This was followed by uncontrollable diarrhea, with rice-water discharges, finally becoming bloody. An intense jaundice supervened, with hemoglobinuria. These symptoms gradually diminished, but the jaundice continued several weeks, and the man returned to work at the end of 5 weeks. In the fatal case the symptoms were much the same, but the jaundice was absent. There was suppression of urine and death on the seventh day. The victim was a robust man, but intemperate. In all the cases there was jaundice, and in 9 hematuria. Intense thirst and burning pain in esophagus characterized all of them. The author cautions against confounding such cases with cholera.

Poisoning with an Anilin Dye Used for Shoe-blackening.—Lament and Guillemain ² report 7 cases of poisoning (4 in one family) caused by the use of shoe-blackening made with an anilin dye. Animals experimentally treated with the same material, applied to their paws, were similarly poisoned. Landouzy and Brouardel also reported similar observations to the Academy of Medicine.

INDUSTRIAL HYGIENE.

Industrial Lead-poisoning.—Whitelegge, ³ Medical Inspector of Factories for England, contributes a paper on lead-poisoning, the data for which were tabulated as the result of a law of 1893, which required every physician, when called to a patient whom he believes to be suffer-

¹ Brit. Med. Jour., Feb. 16, 1901.

² Jour. des Praticiens, Mar. 2, 1901, p. 131.

³ Jour. of Hyg., vol. I, No. 1, 1901, p. 96.

ing with lead-poisoning, contracted in a factory or workshop, to notify the case at once to the inspector of factories. A similar obligation is imposed upon the occupier or owner of the factory, thus constituting a close analogy between this law and that which requires notification of infectious diseases. As one main object of an infectious disease notification act is the protection of the community against such a disease as diphtheria, so repeated notifications of lead-poisoning in the same trade may lead to an investigation, and to the adoption of regulations for the protection of the operatives. The occupations were the following: Smelting, brass-working, sheet lead, printing, file-cutting, plumbing, enameling of hollow ware, white lead working, red lead, earthenware, lithotransferring, glass, enameling of iron plates, electric accumulators, paints and colors, coach-painting, shipbuilding, and other industries. The methods of exposure varied, but were chiefly to the fumes, the dust, and the handling of metallic lead and paint. The writer urges the importance of cleanliness, and not simply cleanliness of the hands, but also of the teeth, nails, and clothing. He also insists upon a periodic medical examination of workmen, by a competent medical examiner, who should have power to suspend any one temporarily or permanently from work whom he may find to be especially susceptible to poisoning.

The Dangers of Cutlery-grinding.—Moritz,¹ of Solingen, presents a statement of the dangers to which knife-grinders and those employed in similar occupations are subjected. The mortality of men employed in this work over 20 years of age is three times as great as that of the general population of the same ages. Men in such employment rarely live to the age of 50. The author, after examining 1250 employees in such work, found only 16% in a healthy condition. This industry has increased in Solingen from 1581 workmen in 1860 to 4027 in 1898, notwithstanding the danger to which they are exposed. The dust consists not only of the steel dust from the knives, scissors, razors, etc., but also the dust of the millstones upon which they are ground, which are reduced in size one-half in 4 weeks' use. The mortality from diseases of the respiratory organs among these workmen constitutes 72.5% of the total mortality, as compared with 35.3% for other occupations of the same ages. The prevention of these dangers is accomplished to some extent by moist grinding, covering the millstones, aspiration of the dust by various forms of apparatus, providing cuspidors, prohibiting alcoholic liquors, prescribing baths and personal cleanliness. Rompke,² of Solingen, contributes a paper on the same subject, in which he compares the workmen at Solingen with those at Sheffield, England, in the same industry. He compares the advantages and disadvantages in each place, and says the mortality from diseases of the chest among the grinders at Sheffield is only 61.7% of the total, as compared with 72.5% among the same class of workmen at Solingen. He attributes this to several causes, among which are the position of the body while at work, the

¹ *Centraltbl. f. allg. Gesundheitspf.*, 1900, S. 283.

² *Viertelj. f. ger. Med. u. öff. Sanitatzwesen*, Oct., 1900.

absorption of less dust at Sheffield, more regular habits, and better housing.

The Pathology of Gannister Disease.—Andrewes¹ reports 2 cases of gannister disease (colored plates of diseased lung), and his examinations confirm those of Greenhow, that the inhalation of heavy angular particles of grit produces in the lungs (1) iron-gray nodules, scattered through consolidated portions of lung; (2) deposition of black mineral matter around the bronchial tubes, arteries, and veins; (3) the development of tuberculosis, intimately associated with, although independent of, the lesions produced by the dust. A chemie analysis of a portion of the lung in one of these cases gave the following results, after drying over a water-bath for 3 hours:

I. ESTIMATION OF ASH.

Dried lung	2.2675 grams.
Loss of weight in combustion	1.1900 "
Residue of ash	1.0775 "
Percentage of ash in dried lung	47.52

II. ESTIMATION OF SILICA.

Dried lung	0.1505 gram.
Silica in same	0.0100 "
Percentage of silica in dried lung	6.64

The Sterilization of Drinking-water.—Bergé² has devised a plan which consists in using perchloric acid as the sterilizing agent. It is easily prepared by decomposing potassium perchlorate by strong sulphuric acid (58° Baumé); the perchloric acid evolved is carried off in a current of air at a constant pressure, which is discharged under water, and as it bubbles up through the water the perchloric acid becomes completely dissolved therein. A concentrated sterilizing solution is easily prepared in this way, and can be used in any quantity desired for securing complete sterilization of a water-supply. Generally, 1 milligram of perchloric acid is enough to sterilize 1 liter of water (0.07 grain per gallon). The operation can be performed on any scale with equal facility; for large supplies of water, as is now being done at Lectoure (Gers, France) and at Ostend, or immediately, by means of a drop-glass, for a decanter or a single glass of water. Various scientific authorities are quoted in support of the efficiency of this method and of its innocuous character; and their conclusions have been adopted by the French Board of Public Health. Sewage water in Brussels, containing 1,000,000 per cubic centimeter (16,000,000 per cubic inch), has been wholly cleared of germs after treatment with perchloric acid. This reagent is considered by the author to be free from the tendency of ozone to cause irritation or inflammation of the breathing organs. The cost of its production would not exceed 0.26 centime per cubic meter (\$2.50 per 1,000,000 gallons) for sterilizing bad water. The apparatus

¹ Ann. Rep. of the Chief Inspector of Factories and Workshops, London, 1901.

² Mémoires de la Soc. des Ingenieurs Civils de France, 1901, p. 601.

employed for its production can be constructed so substantially and of such durable materials that the charges for maintenance and redemption would be extremely low.

Contamination of Rivers as Shown by Bacterial Examination.

—Kober¹ makes the following statements relative to the pollution of streams in the United States: The Mississippi at Minneapolis contains only 18.6 total solids per 100,000 parts, but at St. Louis it contains 244.3 total solids per 100,000. The bacteriologic examinations of the Potomac River, which chemically is said to compare very favorably with other American streams, shows that during the last 10 years the average number of organisms per cubic centimeter has varied from 150 to 20,000, and that over 90 % of the samples contained intestinal bacteria. Recent examinations made between July, 1899, and March, 1900, showed a minimum of 48 bacteria per cubic centimeter in July, and a maximum of 51,000 in the following January, the average of all samples being 3761. Between December, 1889, and April, 1890, 74 deaths from typhoid fever and about 740 cases were registered in Washington, being about twice the number of deaths from this disease which had been registered in any similar period before. During the same period, Cumberland, situated on the Potomac River, about 134 miles above the intake of the Washington aqueduct, suffered from a similar outbreak, with about 485 cases and 45 deaths. Both epidemics were caused by the excreta of a single patient, which had been washed into the Potomac River at a point about 300 feet above the pumping station of the water-supply of Cumberland. The appearance of the disease at Washington emphasizes the possibility of the specific bacillus surviving a water journey of 134 miles, occupying, at the normal rate of flow of the stream, from 2 to 4 days. It is estimated that every year about 500,000 cases of typhoid fever, with no fewer than 45,000 deaths, occur in the United States.

The Royal Commission on Sewage Disposal.—The report of this Commission² adds but little to the previous knowledge upon this subject. It states what was already known to previous Commissioners, "that peat and stiff clay lands are generally unsuitable for the disposal of sewage, that their use is always attended with difficulty, and that where the depth of top soil is very small, say 6 inches or less, the area of such lands which would be required for efficient purification would in certain cases be so great as to render land treatment impracticable." In answer to the question, "Is it practicable uniformly to produce, by artificial processes alone, an effluent which will not putrefy, and so create a nuisance in the stream into which it is discharged?" the Commission presented the following conclusion: "After carefully considering the whole of the evidence, together with the results of our own work, we are satisfied that it is practicable to produce by artificial processes alone, either from sewage or from certain mixtures of sewage and trade refuse, such, for example, as are met with at Leeds and Manchester, effluents

¹ Jour. Am. Med. Assoc., 36, p. 1162, 1901.

² Interim Rep. of the Commissioners on Sewage Disposal, London, Mar., 1901.

which will not putrefy, which would be classed as good according to ordinary chemie standards, and which might be discharged into a stream without fear of creating a nuisance. We think, therefore, that there are cases in which the Local Government Board would be justified in modifying, under proper safeguards, the present rule as regards the application of sewage to land. No general rule as to what these safeguards should be can be laid down at present, and indeed it will probably always be necessary that each case should be considered on its own merits."

Influence of Sand Filters on Typhoid Fever Death-rate.—Chabal,¹ in a discussion upon the usefulness of sand filters, presents the following figures :

CITIES.	TYPHOID MORTALITY BEFORE CONSTRUCTION OF FILTERS; 5-YEAR MEAN.	TYPHOID MORTALITY AFTER CONSTRUCTION OF FILTERS; 5-YEAR MEAN.
Lawrence	113	25
Hamburg	47	6.6
Zürich	76	8
Suburbs of Paris	41	12

Septic Tanks for Sewage Disposal.—Messrs. Alvord and Shields² make the following reasonable comments upon sewage disposal by the septic tank method: "Much of the enthusiasm for this process has arisen because of the unwillingness of experimenters to publish their failures, or in any way record experiences which did not come up to their expectations. The writers have operated several septic tanks during the past 3 years, one of which has had close attention during the whole of that time. The first season it was thought a simple affair to manage it; the second season it was concluded nothing was definitely known about its operation at all; the third season, in humbleness of spirit, it was realized that something was being learned about it, and in the course of another season it is hoped to learn even more. . . . How is it, then, that a septic tank of fixed dimensions succeeds at all, as in so many cases they unquestionably have, and why are some of them such undeniable failures? We think it is, so far at least, purely a matter of chance. One septic tank has been observed, which was carefully designed, which has given as high purification as 80 % of organic matter removed; while another tank of the same design, in a neighboring city of the same size, with about the same quantity of sewage, and with details almost precisely the same, has not effected as good purification, perhaps not half as good, on the average. If this is true in such an instance, how is it possible that tanks hitherto used for chemie precipitation, or cisterns hitherto used for pumping reservoirs, are going to be turned into successful septic tanks at a moment's notice, and for all kinds and quantities of sewage?"

London Sewage.—The following figures relate to the sewage of London, which was treated in 1900 at the two outfalls at Barking and Crossness upon the Thames: ³

¹ Rev. d'Hyg., Apr., 1901, 23, p. 362. ² Engineering Rec., Mar. 16, 1901, p. 247.

³ Engineering Rec., Mar. 16, 1901, p. 246.

	BARKING. GALLONS.	CROSSNESS. GALLONS.	TOTAL GALLONS.
Sewage treated . . .	58,209,600,000	43,321,200,000	101,530,800,000
Maximum daily flow .	316,202,400	215,958,074	
Minimum daily flow .	87,372,000	77,547,948	
	TONS.	TONS.	TONS.
Lime used	12,999	7,455	20,454
Sulphur, iron	2,918	2,011	4,929
Sludge sent to sea . .	1,574,000	798,000	2,372,000
Average per week . .	30,270	15,346	45,616
Screenings	4,176	813	4,989

The increase in the quantity of sewage treated over that of the previous year was 8,315,023,000 gallons, and in the quantity of sludge sent to sea, 82,000 tons.

MUNICIPAL SANITATION.

Street Oiling as a Health Measure.—Longden¹ discusses the subject of oiling roads in Los Angeles, California, a dusty region where the water-supply in summer is deficient. The experiment was made in 1898, upon 6 miles of road. In 1900, 50 miles were oiled. He concludes that well-oiled roads are practically dustless, and that such roads are a boon in any country. The demand for dust-free roads is increasing. The superiority of oiling over watering consists in the lower cost of oiling, and in the fact that it can be used in places where water cannot be had, as in a country with deficient rainfall. Oiled roads are free from dust in summer and from mud in winter, and require only two or three applications of oil in the first season. About 60 barrels of oil per mile were used for a space 12 feet wide, on the first application. The second application required about 40 barrels per mile, and the third still less. The oil cost from \$1.10 to \$1.25 per barrel, and 25 cents for delivery, the total cost being about \$150 per mile for a season. There is a disagreeable odor at first, but this is not permanent.

Underground Bakeries.²—In five districts of London there are 315 bakeries, of which number 245 are situated underground. The city of Manchester, England, has 514 bakehouses, of which 207 are underground. It appears to be a common practice for a baker to rent a house and convert the cellar into a bakery. According to Walsh, "the larger part of the national output of breadstuff is prepared in premises that would not be passed as fit for slaughter-houses." [An underground bakehouse should not be tolerated. On the contrary, the preparation of this most important article of food should be conducted under strict sanitary conditions—namely, abundance of light, good ventilation, absence of rats and all other vermin, and above all, absolute cleanliness in every department of the work. It is also quite as essential that the workmen should be entirely free from every kind of infectious disease as it is in the case of the production and sale of milk. See also paper by E. W. Hope, of Liverpool, "Sanitary Record," August 31, 1900 ;

¹ Engineering Rec., Nov. 24, 1900, p. 490.

² Fabian Tracts, No. 94, London, Dec., 1900.

also experiments by Waldo and Walsh, cited in "Bread, Bakehouses, and Bacteria," pp. 28-40.]

Disposal of Street Sweepings in Paris.—Vincey¹ says that the average price paid for scavenging has now risen to 5.20 francs per ton, entailing a yearly expenditure for Paris of more than 3,150,000 francs for the 600,000 tons removed annually. The proposal to burn the street sweepings and night-soil would raise the cost to at least 7.20 francs per ton, or 4,500,000 francs per year, owing to the additional expense of furnaces, stoking, and other labor. Moreover, the burning itself and the refuse yards would be unhealthy for the neighborhood of the works. The land in the suburbs of Paris, having formerly been manured with night-soil, is generally rich in phosphoric acid and potash, but not in the earthy matter and nitrogen which the night-soil supplies, and which would be destroyed if the latter were burnt. Hence the importance of some speedy, healthy, clean, and economic process for relieving the city of what it wants to get rid of, without depriving the land of fertilizing substances which are so valuable for agriculture. This the author proposes to accomplish by utilizing the existing and projected tramways, between ten o'clock at night and half-past five in the morning, for conveying all sweepings, manure, and sewage to a distance of 5 or 6 miles beyond the city walls, and for bringing in on the return journey supplies of farm produce for the metropolitan markets. The wagons would have four wheels, with plain tires for running on ordinary roads, and also, as in Brussels, an additional pair of disc wheels, held up clear of the ground by a lever, and capable of being lowered so as to run in the tramway grooves, and thereby keep the plain wheels running on the flat of the tramplates.

The Treatment of Domestic Refuse.—Livache² points out that this question has become one of the utmost moment in all large cities. In Paris the daily volume of refuse to be disposed of now amounts to 1600 tons, or about 2600 cubic yards, and the primitive system of disposing of these matters in movable vessels still prevails. A report by Professor Vincey has recently been considered for the treatment of Paris refuse, which is worthy of attention. The author deals with the subject under four heads: (1) The utilization of the excreta without previous treatment—the present plan in Paris. (2) The utilization of excreta after preliminary maceration and trituration. A process of this kind is carried on at Saint Ouen by Mr. Pioger. (3) The calcination of the refuse and excreta. This plan, involving the use of destructors, is said to have originated in England about 1876. An account is given of various trials, and reference is made to the value of the heat evolved in the process of combustion. (4) Treatment of domestic refuse by high-pressure steam. This method is that of Arnold, practised at Philadelphia and more recently at New York, the results of which are here discussed.

¹ *Mémoires de la Soc. des Ingenieurs Civils de France*, 1900, p. 643.

² *Bull. de la Soc. d'Encouragement pour l'Industrie Nationale*, May 31, 1900, p. 730.

SCHOOL HYGIENE.

The following are among the valuable regulations and instructions issued by the London School Board,¹ for the **guidance of teachers and their staff**: (1) In order to maintain the sanitary condition of the schools, the head teacher of each department is held responsible for seeing that the following regulations are carried out: (*a*) The whole premises are to be properly ventilated, both during school hours and after the children have left. (*b*) The rooms are to be washed at least once every 3 weeks, except where otherwise ordered by the Committee. (*c*) Children who may present themselves in a dirty condition are to be required to wash at once; and, if a further purification is needed, to be sent home for the purpose. (*d*) Each child in the school is to be provided with a peg, on which must be hung its cap, bonnet, cloak, or shawl. (*e*) Any bad smells arising from defective drainage are to be reported at once to the head office. (*f*) The urinals and drains must be sluiced out twice a day, viz., in the middle of the day and after school in the evening. (*g*) Schoolkeepers are not supplied with disinfectants, as the Committee are of the opinion that if the troughs, urinals, and W. C.'s are systematically and thoroughly flushed in accordance with the Code of Instructions for the Guidance of Janitors, the use of disinfectants will be unnecessary. In the event of it becoming necessary to disinfect a school, the local authorities must be requested to carry out the work. (2) Any child showing symptoms of an infectious disease, or any child coming from a house² where an infectious disease exists, must be sent home *at once*, and the Superintendent of Visitors must be immediately informed of the case, care being taken to state the name of the child or family infected, in order that inquiries may at once be made with a view to proper steps being taken to prevent the children living in the same house or tenement from attending school. The medical officer of health for the district must also be at the same time informed of the child's exclusion, on a form with which the teachers will be supplied by the head office. Whenever teachers communicate with the medical officer of health for the district, relative to an outbreak of infectious disease in the schools, they must at the same time communicate with the Medical Officer of the Board. Children excluded because of infectious disease, or because of infectious disease in their homes must not be allowed to return to school unless a certificate has been received from the medical officer of health, stating that the premises are free from infection. Head teachers will note that the certificate forwarded by the medical officer of health merely states that the premises from which the children come are free from infection, and does not certify that the children are in a condition to be permitted to resume attendance at school; for it may be that, though the premises are free from infection,

¹ A Manual of School Hygiene, by E. W. Hope, M.D., and E. A. Browne, F.R.C.S.E., Cambridge, England, 1901.

² Children coming from houses in which erysipelas exists, but who are not themselves suffering from the disease, are not to be excluded from the school.

the children coming from such premises may be sickening for an infectious disease. It will be necessary, therefore, for a further period of 7 days to elapse before the return of such children to school, unless the medical officer of health shall specially certify that a longer period of absence is necessary. In the event of the head teacher not receiving the certificate stating that the premises are free from infection, it becomes his duty to send to the offices of the local authority in order that he may procure it.

(5) Children suffering from mumps or measles must be excluded for at least 1 month. Children coming from a house in which mumps exist should be excluded from school for such time as the medical attendant in each case deems necessary. In cases where there has been no medical attendant, children should be excluded from school for 3 weeks. Children suffering from chickenpox must be excluded for at least 2 weeks. Children suffering from whooping-cough must be excluded as long as the cough continues. Children coming from houses where measles, chickenpox, or whooping-cough exists, but who are not themselves suffering from these diseases, must be excluded from school for 14 days. Any child suffering from ringworm or ophthalmia should be excluded from school, and, before it is readmitted, a medical certificate should be produced stating that the child is cured; but whenever such a certificate is not readily procurable, the teacher should exercise his or her discretion in readmitting the child. (6) **Symptoms of Infectious Diseases:** Most of these maladies are attended by the appearance of a rash upon the skin, but this eruption does not at once show itself. The child may ail for a day or two, and the rash not make its appearance until later; but even before the rash shows itself, there are usually certain symptoms present, which should give rise to suspicion on the part of the teacher, and these indicate the need for watchfulness over the child. Thus, a child sickening for an infectious disease usually complains, perhaps, of headache, or perhaps of sore-throat, and often the first symptom perceptible is a shivering fit and occasionally sickness.

VITAL STATISTICS.

Vital Statistics of Italy for 1899.—The following vital statistics are published by the Department of Agriculture, Industry, and Commerce ¹ for the year 1899: Population, 31,762,328; marriages, 235,665; marriage-rate, 7.42 per 1000; marriage-rate, persons married, 14.84 per 1000; births, 1,088,558; birth-rate, 34.27 per 1000; deaths, 703,393; death-rate, 22.15 per 1000; excess of births over deaths, 385,165. The greatest number of marriages were celebrated in February and November, and the least in July and August. The highest birth-rate was found in Puglie and Calabrie (38.1 and 39.2), and the lowest in Liguria and Piedmont (28.5 and 29.2). The greatest number of births occurred in February and May, and the least in September and October. The sexes were in the ratio of 1000 females to 1063 males. The ratio of

¹ Popolazione, Movimento dello Stato Civile, Roma, 1901.

illegitimate births was 6.14%. Of multiple births, the ratio of twins in 15,945,243 births, which occurred in the 14 years 1886–1899, was 1 in 87 births; of triplets, 1 in 6914 births; of quadruplets, 1 in 759,297 births. The highest death-rates in 1899 (25.43 and 25.39) occurred in Sardinia and Puglie, and the lowest (19.2 and 19.5) in Venice and Piedmont. The greatest number of deaths occurred in March and December, and the lowest in September and October. The deaths of infants under 1 year were 168,244, or 23.9% of the total mortality, as compared with 26.1% for the 9 years 1890–1898.

Vital Statistics of Germany for 1897.¹—The infant mortality of Germany, as shown by the returns of 1897, exceeds 1 in 5, and shows no tendency to decrease. More than one-third of the deaths of infants under 1 year were due to “gastroenteritis,” while whooping-cough was more fatal than diphtheria, scarlet fever, and measles combined. Diphtheria was the main cause of death at ages 1 to 15, though the mortality is declining, particularly in the large towns, owing probably to serum treatment. Accidents killed 5332 children. No less than one-third of the deaths during the active years of life (15 to 60) were attributed to various forms of tuberculosis, pulmonary tuberculosis accounting for 82,279. Even in the ages over 60, tuberculosis still occurs in nearly 6% of the death certificates. The frequency of malignant disease has increased in this section even more than in the ages immediately below. The birth-rate was 36.9 per 1000, giving an excess of 15 over the death-rate.

Vital Statistics of the Jews.—Fishberg² concludes as follows: (1) The death-rates of the Jews, at all ages, are relatively and absolutely lower than those of the people among whom they live. (2) The marriage-rates and birth-rates of the Jews are lower than those of Christians; they increase more rapidly because they lose fewer children by death. (3) The Jews are less attacked with infectious diseases than their neighbors. (4) Syphilis and alcoholism are comparatively rare among the Jews. (5) Diabetes is very frequent among the Jews. (6) All the functional neuroses are more frequent among the Jews, while the organic nervous diseases are less so. (7) Insanity is two to five times more common among Jews than among Christians. (8) Blindness, varicose veins, and hemorrhoids are very frequent among Jews. These peculiarities are due to the past history and habits of life of the Jews, and not to racial characteristics. When the Jew mixes with Christians and adopts their customs, these distinctive characteristics disappear.

Vital Statistics of England for the Year 1900.—The General Abstract,³ or advance sheet usually published early in the year following the year to which it refers, is usually nearly as correct as the full report, published a year later. The population is the estimate of the census office for the middle of the year 1900, calculated after the taking of the 1901 census. The population of England and Wales for 1900 was

¹ Hyg. Rundschau, 11.

² Med. Mag., July, 1901, p. 442.

³ General Abstract of Marriages, Births, and Deaths Registered in England in 1900. London, 1901.

32,247,015 ; marriages, 257,139 ; persons married, 514,278 ; marriage-rate, 15.9 per 1000 of the living population ; births, 926,304 (470,784 males and 455,520 females, or in the ratio of 1033 males to 1000 females) ; birth-rate, 28.7 ; deaths, 587,459 ; death-rate, 18.2 ; death-rate of males, 19.5 ; of females, 17.0. The marriage-rate of London was 17.9 persons married ; the birth-rate, 29 ; and the death-rate, 18.6.

Infant Mortality.—Reid¹ shows that the employment of mothers is attended with increased infant mortality, and cites the following figures in support of his position :

DEATHS OF CHILDREN UNDER 1 YEAR, PER 1000 BIRTHS, IN THREE CLASSES OF ARTISAN TOWNS IN STAFFORDSHIRE, ENGLAND.

	CLASS I, MANY WOMEN ENGAGED IN WORK.	CLASS II, FEWER WOMEN ENGAGED IN WORK.	CLASS III, PRACTI- CALLY NO WOMEN ENGAGED IN WORK.
Population census of 1901 . .	147,281	198,955	182,864
Ten years, 1881-1890	195	166	152
Ten years, 1891-1900	211	177	167

While there was a general increase in the infant death-rate, practically the same relative proportion was maintained in the three groups of towns. The author advocates the teaching of elementary hygiene in the schools, the restriction of mothers from engaging in work for 3 months after confinement, and the establishment of crèches by local authorities.

Results of Serum Treatment in Diphtheria.—Siegert,² of Strassburg, presents the results of 37,000 cases of diphtheria in which operations were performed. These results are taken from reports of 69 hospitals in Germany, Austria, Switzerland, and in Paris. He shows not only the reduction of fatality under serum treatment, but a reduction in the fatality of operated cases and in the ratio of operated cases. He divides the 9 years 1890-1898 into a "fore-serum" period of 4 years, 1890-1893, an introduction year, 1894, and a "serum period," 1895-1898. His first table contains the results of 36,422 operated cases, with 18,336 deaths. Of these cases, 17,673 cases and 10,701 deaths, or 60%, occurred in the "fore-serum" period. The fatality of the "serum" period was 35.7%, and that of the introduction year was 53.7%. In the second table the general fatality from diphtheria in the "fore-serum" period was 41.5%, and that of the "serum" period was 16.5%. This table embraces the results in 23 hospitals, with a total of 41,917 cases. Another table presents the ratio of operated cases to all cases treated, in 21 hospitals, and shows very plainly that the necessity for operation is diminished under the effects of serum treatment, since the ratio of operated cases in the fore-serum period was 47.2%

¹ Public Health, Oct., 1901, pp. 39 and 40.

² Vier Jahre vor und nach der Einführung der Serumbehandlung der Diphtherie, 1900.

and that of the serum period was only 27.5 %. The whole number of cases considered in this table was 40,038.

Mortality from Diphtheria before and after the Introduction of Serum Treatment.—Weissenfeld,¹ of Bonn, quotes the following death-rates from diphtheria and croup in different countries for the period 1889–1898. The figures are expressed as a death-rate per 10,000 of the living population :

DEATH-RATES FROM DIPHTHERIA AND CROUP IN DIFFERENT COUNTRIES, 1889–1898.

	GERMANY.	AUSTRIA.	BELGIUM.	FRANCE.	HOLLAND.	SWITZER- LAND.	ENGLAND.
1889 . . .	10.9	7.1	3.9	6.6		6.0	2.6
1890 . . .	10.1	7.3	3.7	6.1		7.6	2.4
1891 . . .	8.5	8.8	3.3	6.0	4.9	8.2	2.1
1892 . . .	9.7	9.5	2.6	5.4	4.5	5.2	2.5
1893 . . .	12.6	9.6	4.0	5.5	4.0	10.2	4.3
1894 . . .	10.2	10.2	4.6	4.1	3.3	8.0	3.8
1895 . . .	5.4	6.3	2.9	1.9	1.4	3.4	3.5
1896 . . .	4.3	4.9	1.6	1.8	2.5	3.4	3.9
1897 . . .	3.5	4.7	1.3	1.2	2.2	3.0	3.1
1898 . . .	3.4	3.8	1.4	1.2	1.7	3.7	3.1
1899 . . .	3.2						

¹ Centralbl. f. allg. Gesundheitspf., 19, 318, 1901.

PHYSIOLOGIC CHEMISTRY.

By WALTER JONES, M.D., AND REID HUNT, M.D.,

OF BALTIMORE, MD.

There has been much discussion as to whether the **acetone** which is formed under certain pathologic conditions comes from fats or from proteids. While acetone is readily formed from fats by chemie means, attempts to obtain it from proteids have hitherto been unsuccessful. Blumenthal and Nenberg,¹ however, find that acetone and an aldehyd can be obtained from gelatin by oxidation with iron salts and hydrogen dioxid. It is very probable that similar results can be obtained with proteids.

Cavazzani² describes a method for determining the **alkalinity of the blood**, based upon the precipitation of some proteid contained in it by H_2SO_4 . The author first reports experiments with casein. This substance was dissolved in weak alkali and then one-hundredth normal H_2SO_4 was added until the precipitation was complete; the solution was now found to be neutral to litmus. There are proteid substances in the blood which react in the same way as casein. To determine the moment when the precipitation is complete, the author devised a little apparatus by which the transparency of a laked solution of blood is observed; very dilute H_2SO_4 is then added; the blood is turbid at first, but as the precipitate falls it becomes clear. Acid is added until no more turbidity is produced, and from the amount of acid added, the amount of alkali necessary to keep the proteid in solution can be calculated.

According to Müller,³ **antipyrin** passes unaltered into the urine of human beings when given in small doses, but when large quantities are used, the conjugate sulphates increase about 50%. Umbach,⁴ on the contrary, finds that while antipyrin causes an increase in the output of conjugate sulphates in the case of dogs, this is not at all true of man. Quite in accordance with Umbach is Calu's⁵ discovery that after the use of large doses of antipyrin the urine of man shows no optical activity, nor does it reduce Fehling's solution after hydrolysis with a mineral acid. The ratio of preformed to conjugate sulphates is also normal. From the urine of a dog which had been fed with antipyrin

¹ Deut. med. Woch., XXVII, S. 6.

² Arch. Ital. de Biol., XXXIV, p. 79.

³ Centralbl. f. klin. Med., 1884, No. 36.

⁴ Arch. f. exper. Path. u. Pharm., VII, S. 161.

⁵ Berlin. klin. Woch., 1884, No. 36.

Lawrow ¹ has lately succeeded in isolating in large quantity a paired glycuronic acid whose crystalline barium salt has the composition represented by the formula $(C_{17}H_{19}N_2O_8)_2Ba \cdot BaCl_2 \cdot H_2O$. So far as its composition is concerned this compound may be regarded as a double salt of barium chlorid and barium oxyantipyrin glycuronate. This shows that in the case of the dog at least antipyrin is to a considerable extent oxidized to oxyantipyrin, especially as Lawrow was unable, in any of his experiments, to show the presence of unaltered antipyrin.

Arginin.—In his controversy with Siegfried concerning the contamination of antipeptone with hexone bases, Kutscher ² announced the discovery of a substance which has the composition and chemie properties of arginin, but which differs from arginin in its optical behavior. Kutscher ³ has lately found this substance several times among the products of the tryptic digestion of fibrin, but the compound is to be found as a decomposition product of only this one proteid. An examination of the material for arginin is made in the ordinary way by precipitation with silver nitrate and barium hydroxid. The precipitate is suspended in water, the silver removed with hydrogen sulphid, and, after neutralization with nitric acid, the solution is allowed to evaporate to crystallization. The less soluble crusts which are first precipitated were easily purified by recrystallization, and were shown to be the optically inactive form of arginin. That these two optically different forms are stereoisomerically related seems to be conclusively shown by the conversion of the ordinary dextrorotatory into the racemic form, a result which Kutscher shows can easily be brought about by heating with concentrated sulphuric acid. It is only necessary to remove the sulphuric acid with barium hydroxid, neutralize with nitric acid, and evaporate the solution to crystallization. The inactive modification, as already stated, is quite difficultly soluble, and crystallizes out of solutions of moderate concentration. The same transformation is found to occur when the neutral nitrate of dextrorotatory arginin is dehydrated at 80° C., and then heated for 20 minutes at 210° C. The substance thus prepared was purified by recrystallization, and completely identified with the inactive arginin, which is produced in a tryptic digestion of fibrin. Kutscher and Bénech ⁴ find that by the oxidation of arginin with barium permanganate (but not with other oxidizing agents) relatively large quantities of guanidin are formed, and Kutscher ⁵ announces later that he has succeeded in finding both γ -guanidin butyric acid and succinic acid as a result of the same oxidation. Taken in connection with the work of Schulze ⁶ and Ellenger, ⁷ this work shows that arginin can be nothing other than guanidin- α -amido-valeric acid. On this assumption Kutscher's oxidation may easily be explained as occurring

¹ Zeit. f. physiol. Chem., XXXII, S. 111.

² Zeit. f. physiol. Chem., XXVI, S. 210; XXVIII, S. 88.

³ Zeit. f. physiol. Chem., XXXIII, S. 476.

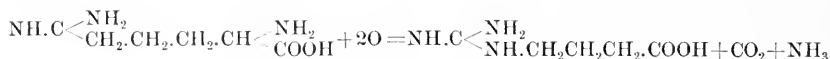
⁴ Zeit. f. physiol. Chem., XXXII, S. 278.

⁵ Zeit. f. physiol. Chem., XXXII, S. 413.

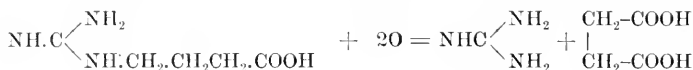
⁶ Ber. d. deut. chem. Gesell., 32, S. 3191.

⁷ Zeit. f. physiol. Chem., XXIX, S. 334.

in two stages. The arginin is first oxidized to guanidin butyric acid, thus :



which in turn is oxidized to guanidin and succinic acid :



Kutscher calls attention to the Gomp-Besanes ¹ discovery of succinic acid in the thymus of the calf and the spleen of the ox, and offers the opinion that succinic acid has the same origin as arginin, viz., the hex-one group of the proteid molecule.

Camerer ² publishes the results of further analyses of the **ash of newborn children**, and compares them with those of the mother's milk. He finds the same want of correspondence (required by Bunge's well-known theory) as in his earlier work. De Lange ³ obtains similar results.

Bence-Jones Proteid.—Magnus-Levy ⁴ has obtained a large amount of this substance, which has hitherto been regarded as heteroalbumose, and finds that it is coagulable by heat and decomposed by pepsin hydrochloric acid with the formation of acid-albumin and albumose. As is well known, specimens of urine which contain this proteid yield a precipitate on warming, which disappears when the urine cools. Magnus-Levy explains this by certain observations of Spiro ⁵ concerning the influence of nitrogenous substances on the coagulation of proteids. When the proteid is freed from the constituents of the urine, it behaves like any coagulable proteid.

According to the physical-chemic investigations of Buffa, ⁶ the **chlorids in the blood-serum** are not present in the free condition, but are in combination with proteids. When the latter are precipitated by ammonium sulphate, the chlorids are set free while the sulphate forms combinations with the proteids which are insoluble in the serum.

Starke ⁷ undertakes to prove that the globulins are present in the body juices in the form of combinations with alkalies. He maintains that it is only on this assumption that the precipitation of these bodies by dilute acids, by carbon dioxid, and by dialysis can be explained. The author applies this theory to the **coagulation of the blood**, as follows : Fibrin is a globulin which is held in solution by alkali ; when the strength of the latter is diminished (*e. g.*, by the precipitation of calcium carbonate, which Moerner maintains occurs when the blood coagulates), the fibrin is precipitated. An increase in the alkalinity of the blood prevents coagulation. Starke ⁸ shows that when a solution

¹ Ann. d. Chem. u. Pharm., 98, S. 1.

² *Ibid.*, S. 526.

³ Zeit. f. physiol. Chem., xxx, S. 182.

⁴ Arch. Intern. de Pharmacodyn. et de Therap., vii, p. 425.

⁵ Zeit. f. Biol., xl, S. 419.

⁶ Zeit. f. Biol., xl, S. 599.

⁷ Zeit. f. physiol. Chem., xxx, S. 200.

⁸ *Ibid.*, S. 494.

of egg-albumen is much diluted with water and heated at 56° C., the albumen is transformed into a body having all the properties of a globulin. It is precipitated by carbon dioxid, by dialysis, by magnesium sulphate, is insoluble in pure water, etc.

Moerner's ¹ work on the two isomeric forms of **cystin**, which are obtained by the hydrolysis of horn, was reported in the YEAR-BOOK of 1901. Embden ² now shows methods for the isolation of cystin and succeeds in obtaining both cystin and cystein by the hydrolysis of egg-albumen. The keratin of horn and that of egg-albumen are very different in their chemic conduct, so that Embden's discovery makes it appear highly probable that in all proteids there is a cystin group which is responsible for the unoxidized sulphur which these bodies contain.

Korean ³ has studied the **effects upon metabolism of various kinds of foods**. The experiments were made upon himself, and he remained quietly in bed to avoid the changes caused by muscular movements. After a meal consisting largely of fat, no increase in metabolism occurred. This result agrees with that of previous workers. After carbohydrates there was an increase in the excretion of carbon dioxid, but the total increase in metabolism was slight. Proteid caused a marked increase in metabolism. A meal consisting of substances very difficult of digestion did not cause any marked increase in metabolism; hence the work of digestion does not seem to be much increased by the taking of food, or perhaps the changes in metabolism caused by the work of the digestive organs are compensated for by a decrease in the metabolism of other organs.

Mead and Gies ⁴ have investigated the **effects of tellurium compounds upon nutrition**, and find that nontoxic doses do not materially affect the metabolism of dogs even when the administration is continued for a week. Much of the tellurium compound, in whatever manner it is introduced, is quickly reduced; if injected subcutaneously, metallic tellurium is found about the point of injection; while when it is given by the stomach, it is found on the mucous membrane of the intestines. Some tellurium (in the form of methyl tellurid) is excreted by the lungs and skin. This gives the breath and sweat a disagreeable odor, which persists for months after the last administration. With the exception of a marked diminution of the acid in the gastric juice, the processes of digestion are not materially influenced by moderate doses of the compounds of tellurium. The action of the digestive ferments was but little influenced. The authors reach the conclusion, previously arrived at by Czapek and Weil, that in many respects the action of tellurium in the body is like that of selenium, arsenic, and antimony.

Enzymes.—According to Schiff, ⁵ the spleen contains a substance which during digestion passes through the blood to the pancreas and

¹ Zeit. f. physiol. Chem., XXVIII, S. 595.

² Zeit. f. physiol. Chem., XXXII, S. 94. ³ Skand. Arch. f. Physiol., XI, S. 176.

⁴ Am. Jour. of Physiol., V, p. 104; Phila. Med. Jour., VII, p. 566.

⁵ Maly's Jahresber., 7, S. 320.

there gives rise to the trypsin which takes part in the pancreatic proteolysis. Herzen¹ also found that pancreatic juice, when mixed with an infusion of the spleen, is capable of digesting proteids much more rapidly than normal pancreatic juice, and he ascribes this increase to a zymogen of trypsin which is contained in the spleen. On the contrary, Ewald² claims that the proteolytic power of the pancreatic juice of dogs is not sensibly decreased after extirpation of the spleen. A very conclusive series of experiments by Hedin and Rowland³ seems partly to reconcile these two apparently contradictory views. The fresh spleen of different animal species (ox, horse, sheep, and pig) was pressed out with a hydraulic press and the juice submitted to autodigestion under various conditions of acidity, and the extent of the digestion was decided by the amount of nitrogen, incapable of precipitation with tannic acid, which remains in the solution. In some experiments the precipitation was made with phosphotungstic acid, and in others with zinc sulphate, in order that conclusions might be drawn in regard to the relative quantities of albumose and peptone + amido-acids that have been formed. They found that the spleen of all the animals named contains a proteolytic enzyme whose activity is increased by the addition of either acetic acid or hydrochloric acid, but is markedly decreased by the addition of a trace of sodium carbonate. This enzyme cannot be trypsin, which exhibits its greatest activity in a faintly alkaline medium.

Pawlow and Schoumow-Siamnowski were able to obtain pure gastric juice by means of gastroesophagofistula in dogs, and by cooling down to 0° some of the juice thus obtained, Schoumow-Siamnowski⁴ obtained a granular substance which was found to be a **proteid body containing chlorin** and a trace of iron, and exhibiting powerful proteolytic activity. Pekelharing⁵ extracted the fundus mucosa of the pig's stomach with 0.2% hydrochloric acid, and dialyzed the solution until the acidity had been reduced to 0.02%. The precipitate which was formed was centrifugated, washed, and dried. It is a pale yellow powder, scarcely hygroscopic, not soluble in water or 0.02% hydrochloric acid, but easily soluble in stronger acids. The substance responds to all of the proteid color reactions, is powerfully proteolytic, and contains about 1% of phosphorus. By washing with alcohol it loses its proteolytic power and at the same time its solubility in 0.2% hydrochloric acid. By hydrolysis it is split into (1) an insoluble nucleoproteid of acid nature; (2) an albumose; (3) a phosphorus compound easily soluble in warm alcohol. Pekelharing does not state whether or not his pepsin contains chlorin. Nencki and Sieber⁶ use the Pawlow method of obtaining pure gastric juice, and apply Pekelharing's method of obtaining pepsin from it. Their preparation contains phosphorus and iron, both of which they believe to be in chemie combination in the pepsin molecule. They show that the ratio of phosphorus to iron in their preparation is the same as in

¹ Pflüger's Arch., 30, S. 295; 84, S. 126.

² Arch. de Physiol., 30, p. 363.

³ Zeit. f. physiol. Chem., XXXII, S. 341.

⁴ Arch. f. exper. Path. u. Pharm., 33, S. 336.

⁵ Zeit. f. physiol. Chem., XXII, S. 233.

⁶ Zeit. f. physiol. Chem., XXXII, S. 291.

ferrous phosphate, and by washing the enzyme with alcohol, lecithin is removed and the material loses its proteolytic activity. They consider pepsin a most complex, labile molecule, containing a nucleoprotein in some unknown manner of combination with iron, phosphoric acid, a pentose, lecithin, and chlorin, and after a rather hypothetical argument conclude in somewhat guarded language that the pepsin molecule may be capable of performing all three of the enzymic decompositions which can be effected with gastric juice and which have hitherto been ascribed to three different enzymes. This conclusion is based almost entirely on the observation that their preparation digests fibrin, coagulates caseinogen, and converts albumose into a substance that has many of the properties of coagulated proteins.

Some very interesting experiments on **lipase, the fat-splitting enzyme**, are reported by Kastle and Loewenhardt.¹ Ethyl butyrate, which is easily decomposed by the enzyme, was used by the authors to detect its presence and to determine its quantity in the various organs of the body. The following relative lipolytic activities were found in the organs of the pig: Pancreas, 1.00; liver, 2.93; intestinal mucosa, 0.75; kidney, 0.50; submaxillary gland, 0.36. **Lipase was also found in the stomach.** This observation is very interesting, since it offers an explanation for an observation which has long puzzled physiologists, viz., that fats are hydrolyzed to some extent in the stomach. The authors find that lipase is a much more stable enzyme than has been supposed; the activity of preparations frequently increased, rather than decreased, on standing several days. A long series of experiments, in which various antiseptics were introduced, showed that in the case of both hepatic and pancreatic lipase the activity of the enzyme is almost completely arrested by the presence of hydrofluoric acid and fluorids, and is considerably diminished by hydrocyanic acid and thymol. On the other hand, the inhibitory action of certain antiseptics is quite different toward the two enzymes, so much so that one is led to suspect that the two enzymes are not identical. For instance, strychnin sulphate and carbolic acid in a certain dilution both reduce the activity of the pancreatic extract about 30%, while in the same dilution they exert no appreciable influence on the hepatic enzyme. The law that the continual removal of one of the products of a chemie reaction causes its continual formation was known to Proust in the early part of the century. Conversely, the retarding action which is caused by the accumulation of the products of a chemie reaction is just as universally recognized. This law would in itself furnish an explanation of the **failure of enzymes to produce complete hydrolysis**, but in several instances it has been experimentally shown that the decompositions produced under the influence of enzymes do reach completion when the products of the reaction are removed as they are formed.² Hill,³ however, went further and furnished an explanation of the law itself when he found that maltase not only decomposes maltose into dextrose, but is capable

¹ Am. Chem. Jour., XXIV, p. 491.

² Sheridan Lea, Jour. of Physiol., 11, p. 226.

³ Jour. Am. Chem. Soc., 73, p. 634.

also of forming a synthesis of maltose from dextrose. Thus, whenever dextrose or maltose is submitted to the influence of the enzyme the one is converted into the other until a certain condition of equilibrium has been established and no further decomposition follows. When, however, either one of these substances is removed, more of this must be formed at the expense of the other until equilibrium has again been established. Kastle and Loewenhardt now show that **lipase is also reversible in its action**, being capable not only of splitting ethyl butyrate into its corresponding acid and alcohol, but of forming the ethereal salt from the acid and the alcohol. This reversibility of the action of the enzyme explains the incompleteness of its action upon ethyl butyrate, and also affords the basis for a theory of fat-absorption. The conditions in the intestine are favorable for the complete hydrolysis of the fats, since the products (fatty acids and glycerin) are rapidly absorbed and there is little opportunity for their recombination. In the epithelial cells, on the other hand, the conditions are most favorable for the synthesis of the fat. The glycerin and fatty acids are present in large quantity, and since they are being constantly absorbed from the intestines, equilibrium in the epithelial cells can only be established by the formation of neutral fat—a process which takes place under the influence of the lipase present in the intestinal mucosa. When the absorption from the intestine is complete, the reverse process—*i. e.*, the cleavage of the fat—begins; the products pass into the lymph, where they combine again under the influence of the lipase present in this liquid. Loewenhardt¹ has studied still further the occurrence of lipase in the various organs and tissues, and concludes that the degree of lipolytic activity possessed by an organ is related to the fat-transformation, whether synthetic or destructive, known to occur in the organ. Thus, the active mammary gland possesses a lipolytic activity equal to that of the pancreas, while the resting mammary gland possesses but a trace of activity. The occurrence of considerable quantities of lipase in the subcutaneous connective tissue offers an explanation of the storing of fat in this locality, and it also explains the absorption of this fat during inanition or malnutrition. In these states the blood and lymph may be supposed to become poor in fatty acid and glycerin, in which case the lipase in the subcutaneous fat would tend to restore equilibrium by effecting the hydrolysis of the fat. *

Mendel and Underhill² summarize their experiments on **papain and bromolin proteolysis**, as follows: (1) The papain preparations show proteolytic activity in both alkaline and slightly acid media. (2) The primary products of proteolysis, carefully studied in the case of casein, correspond closely with those obtained by F. Alexander from peptic digestions. (3) Leucin, tyrosin, and tryptophan (protein chromogen)—all characteristic products of tryptic proteolysis—were not detected in any digestion where the influence of bacterial enzymes was excluded. (4) These observations indicate that papain differs from known proteolytic enzymes of animal origin, and also from vegetable

¹ Am. Jour. of Physiol., v, p. xii.

² Am. Jour. of Physiol., v, p. xiii.

enzymes like the bromolin (from the pineapple), which readily forms leucin, tyrosin, and tryptophan, even in acid media.

Mendel and Schneider¹ have confirmed and extended the experiments made by Mendel and Jackson upon the **excretion of cynurenic acid**. The view that this acid is of intestinal origin is disproved by the fact that it was found in the urine of fasting dogs which had received large doses of calomel. The urine of such dogs was entirely free from ethereal sulphates (indicating the absence of putrefactive processes in the intestines), but cynurenic acid was found in amounts varying from 12 to 158 milligrams per day. No output of cynurenic acid was observed after the ingestion of gelatin, ovomucoid, elastin, "chondrin," or commercial thymus powder. Results similar to these have been obtained by Gies.² This author also confirms the older statements that the excretion of cynurenic acid occurs entirely independently of that of uric acid.

Zuelzer³ finds that **experimental albumosuria** can be caused in dogs by the administration of pyrodin; the presence of the albumosuria is, as a rule, soon obscured by the appearance of albuminuria. There was also marked progressive anemia, and the "bones were filled with lymphatic tissue." Hamburger⁴ describes 2 cases of albumosuria associated with multiple myeloma. The urines gave the well-known reactions of the albumoses, the chief of which is the formation with nitric acid of a precipitate which dissolves on heating and appears again on cooling. The author reviews similar reported cases and points out that albumosuria usually indicates the presence of myelomas.

Instances are so numerous of **fats which are derived from a monobasic acid** and a monacid alcohol containing the same number of carbon atoms, that one is almost led to the conclusion that the tissues have at their disposal one of the two constituents, from which the other is produced by a simple oxidation or reduction, as the case requires. Thus, cetyl palmitate (from the alcohol $C_{15}H_{31}CH_2OH$ and the acid $C_{15}H_{31}CO_2H$) is the chief constituent of spermaceti. This fat also contains smaller quantities of three ethereal salts which are derived from acids of the composition $C_{11}H_{23}COOH$, $C_{13}H_{27}COOH$, and $C_{17}H_{35}COOH$ respectively, and from the corresponding alcohols, $C_{11}H_{23}CH_2OH$, $C_{13}H_{27}CH_2OH$, and $C_{17}H_{35}CH_2OH$. So also in Chinese beeswax is found a fat which is derived from ceryl alcohol, $C_{26}H_{53}CH_2OH$, and the corresponding cerotic acid, $C_{26}H_{53}COOH$. Sundwik⁵ finds that the wax produced by *Psylla alni*, a leaf-louse which lives on *Alnus incana*, is chiefly a fat which, on saponification, yields psyllostearyl alcohol ($C_{32}H_{65}COOH$) and the corresponding psyllostearic acid ($C_{32}H_{65}CH_2OH$).

Formation of Glycogen from Levulose.—Sachs has shown in earlier experiments that removal of the liver does not lower the tolerance of animals for dextrose, whereas it does lower the tolerance for levulose. Patients with diseases of the liver were also found incapable

¹ Am. Jour. of Physiol., v, p. x.

² *Ibid.*, p. 191.

³ Berlin. klin. Woch., XXXVII, S. 894.

⁴ Bull. Johns Hopkins Hosp., XII, p. 38.

⁵ Zeit. f. physiol. Chem., XXXII, S. 355.

of utilizing as large quantities of levulose as normally. The tolerance for dextrose of animals deprived of the liver is explained by the formation of glycogen by the muscles. In the present paper Sachs ¹ reports experiments showing that the muscles are incapable of forming glycogen from levulose; hence after removal of the liver the tolerance for levulose is diminished.

Schoendorff ² criticizes the work which has been done hitherto to show that **glycogen can be formed from proteids**. He holds many of the experiments to be faulty because the authors did not make sure that the proteids fed were free from carbohydrates, while in other cases the methods of determining the glycogen are open to criticism. The author's own experiments were made with casein, a proteid which is easily obtained in pure condition and which does not seem to contain a carbohydrate group. This substance was fed to frogs. The animals increased in weight, but the total amount of glycogen in their bodies did not increase. Hence Schoendorff concludes that proteids which do not contain a carbohydrate group do not give rise to the formation of glycogen.

Formation of Sugar from Fat.—Since the work of Minkowski upon the glycosuria following extirpation of the pancreas, it has generally been held that the ratio between the sugar and the nitrogen of the urine (2.8 to 1) found by him when the animals received an exclusive meat diet represents the maximum amount of sugar which can be formed from proteid. Hartogh and Schumm ³ find that in phloridzin glycosuria the ratio of sugar to urine nitrogen may be as great as 13 to 1. It seems hardly possible for such quantities of sugar to be formed from the proteid destroyed. The authors think the most plausible explanation to be that some of the sugar was formed from fat.

Camus and Pagniez ⁴ have studied the **globulicidal action of urine** and find that normal human urine dissolves the red blood-corpuscles of rabbits. This action seems to be due to the acidity of the urine. Certain pathologic urines, however, are globulicidal, although they have an alkaline reaction. Some pleuritic and ascitic effusions are also globulicidal.

Hemin.—By treating acetohemin with a mixture of acetic and hydriodic acids, Nencki and Zaleski ⁵ obtain an amorphous red granular pigment which contains iodine, but no iron, and which shows absorption bands very similar to those of hematoporphyrin. By further treatment of this pigment with hydriodic acid and phosphonium iodide there is formed an iodine-free crystalline compound which unites with mineral acids to form crystalline salts. It has the formula $C_{16}H_{18}N_2O_2$ and is called mesoporphyrin on account of its relation to hematoporphyrin and to phylloporphyrin, $C_{16}H_{18}N_2O$, a substance which Sehunk and Marchlewski ⁶ obtained by the action of alkalis on a derivative of chloro-

¹ Zeit. f. klin. Med., XLII, S. 434.

² Pflüger's Arch., LXXXII, S. 60.

³ Arch. f. exper. Path. u. Pharm., XLV, S. 11.

⁴ Compt. Rend. de la Soc. de Biol., LII, pp. 858 and 975.

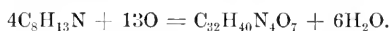
⁵ Ber. d. deut. chem. Gesell., 34, S. 997.

⁶ Ann. d. Chem., 284, 81, u. 290, 306.

phyl. When slowly deposited from a solution in alcohol, the substance crystallizes in forms which closely resemble those of hematoidin, and when treated with hydrochloric acid and hydrogen superoxid, mesoporphyrin is easily converted into monochlorhematoporphyrin. By the use of more concentrated hydriodic acid the reduction of hemin occurs in an entirely different way. Under these conditions there is formed a volatile oil which responds to the pyrrol reaction with a pine splinter that has been moistened with hydrochloric acid, and forms a mercury compound as well as a crystalline picrate, both of which give analytic data which lead to the formula $C_8H_{13}N$ for the oil itself. After a very careful examination of this oil, which they call hemopyrrol, Nencki and Zaleski conclude that the substance is certainly a pyrrol derivative, and that it is in all probability that one of the possible methylpropylpyrrols which is represented by the formula—



It is of special interest that the substance, when injected into rabbits, gives rise to urobilin, but causes no increase in the indican. From Maly's¹ analysis of urobilin we are led to the formula $C_{32}H_{40}N_4O_7$; hence the formation of urobilin in this way must involve four molecules of hemopyrrol:



As one molecule of hemin is almost quantitatively split by bromin into two molecules of hematoporphyrin, it is likely that the latter substance is constructed of two molecules of hemopyrrol. Assuming that a similar line of argument is applicable to mesoporphyrin and phylloporphyrin, the authors propose structural formulas for hematoporphyrin and phylloporphyrin, each of which involves two hemopyrrol groups, thus pointing out a more or less probable relation between hemoglobin, the coloring matter of the blood, and chlorophyl, the coloring matter of plants. By a curious mixture of good chemie argument and unwarranted assumption, the authors arrive at an appalling structural formula for hemin. This formula involves four hemopyrrol groups, and while it rests upon some experimental evidence, it would nevertheless be regarded as highly speculative had it come from a less creditable source than Nencki's laboratory.

Fussell² gives an interesting description of the various rings observed in **Heller's nitric acid test for albumin**. Three rings may usually be seen: (1) A color ring, especially marked in concentrated urines or in the urines of patients taking potassium iodid, salol, or other coal-tar products, and which is at the point of contact of acid and urine; (2) the white zone of albumin which forms above the preceding; and (3) the urate ring which is formed above the albumin ring. The latter is quickly formed and is easily dissipated by heat.

¹ Maly's Jahresber., 5, S. 232.

² Univ. Med. Mag., XLII, p. 721.

Wolowski¹ describes a brief method for the quantitative determination of **indican in the urine**, and discusses the significance of indicanuria. The method is a modification of the well-known method of Jaffé. The urine is treated with lead acetate and filtered and then placed in several small test-tubes. To each of these a known, but variable, amount of a solution of potassium or calcium hypochlorite is added. Concentrated HCl and a little chloroform are then added. The depth to which the chloroform is colored gives fairly accurate results as to the amount of indican present. The author regards indicanuria an important factor in pathology. He thinks it the sole cause of many acute and chronic diseases, as certain trophic neuroses of the skin, certain cases of vertigo, and a large number of gastric disturbances.

After severe criticism of the methods which are commonly used for the **determination of urinary indican**, Bouma² offers the following: A measured amount of the urine which is to be tested (say 20 cc.) is treated with one-tenth of its volume of lead acetate and the solution filtered through a dry filter paper. To a measured portion of the filtrate (say 5.5 cc., corresponding to 5 cc. of urine) is added a quantity of a reagent prepared by dissolving 20 milligrams of isatin in a liter of strong hydrochloric acid. Five cubic centimeters of the reagent will usually be sufficient; but as an excess does no harm, it is just as well to add 10 cc. The liquid is heated to the boiling-point, and after cooling is shaken out with chloroform. The indigo red which has been formed is taken up by the chloroform, and by a comparison of the color of the solution with the colors of previously prepared standard solutions of indigo red in chloroform the quantity of indican present in the urine can be ascertained. The execution of the method requires only a few minutes, but the isatin solution must be freshly prepared, and the action of sunlight on indigo red causes some difficulty in the preparation of the standard solutions.

Lactic Acid.—It is well known that after complete extirpation of the liver of geese, lactic acid appears in the urine, and that nearly all of the nitrogen which is normally present as uric acid is now to be found in the form of ammonium salts.³ Nebelthan⁴ has shown that under similar conditions the urine of frogs contains lactic acid, and Zillessen⁵ found the substance in the urine of rabbits after ligation of the liver artery. Taken in connection with Schultzen and Riess's⁶ discovery of lactic acid in the urine in cases of yellow atrophy of the liver, these observations establish a connection between the appearance of lactic acid in the urine and a disturbance of the action of the liver. Aratei⁷ showed that even when there is no direct interference with the action of the liver, the urine of rabbits contains lactic acid when from any cause there is an insufficient supply of oxygen—an observation which Munzer and

¹ Deut. med. Woch., XXVII, S. 23.

² Zeit. f. physiol. Chem., XXXII, S. 91.

³ Menkowski, Arch. f. exper. Path. u. Pharm., 21, S. 41.

⁴ Zeit. f. Biol., 25, S. 122.

⁵ Zeit. f. physiol. Chem., xv, S. 389.

⁶ Zeit. f. physiol. Chem., XVII, S. 331.

⁷ Zeit. f. physiol. Chem., XIX, S. 422.

Palma¹ were able to verify in cases of carbon monoxid poisoning in man. Saito and Katsuyama² now find that the blood of the hen normally contains paralactic acid, and describe a series of experiments which they made for the purpose of finding whether this normal amount is increased when the animal is insufficiently supplied with oxygen. Hens were cautiously poisoned with carbon monoxid gas and revived in the air. When this had been repeated several times, it was found that the lactic acid, both in the blood and in the urine, was markedly increased, and that the additional lactic acid is identical with that which is normally present—*i. e.*, paralactic acid.

Lecithin.—Burow,³ working in Bunge's laboratory, finds that Stoklosa's method for the estimation of lecithin in milk is very inaccurate. This method consists in evaporating the milk to dryness, extracting in a Soxhlet apparatus, first with ether and then successively six times with alcohol. The united extracts are evaporated to dryness and the phosphorus is determined in the residue. Burow claims that no phosphorus compound goes into the ether, and that the alcohol dissolves a sufficient amount of disodium phosphate to vitiate the result. He therefore uses a mixture of equal quantities of alcohol and ether, to which a little acetic acid has been added, claiming that the presence of ether in this mixture prevents the solvent action of alcohol on inorganic phosphates, but in no way diminishes its power to take up lecithin. To 200 cc. of this mixture 100 cc. of milk is added, drop at a time. After standing 24 hours in a well-stoppered vessel, the liquid is filtered off and evaporated to a syrup, at a temperature not exceeding 50°. The syrup is extracted several times with ether, the ether evaporated, and the phosphorus determined in the residue in the usual way. By the application of this method to the milk of the dog, cow, and woman, he finds the lecithin related to the total proteid as 1 : 47, 1 : 71, and 1 : 33 respectively, and notes that this is also the order in which the ratio of weight of brain to total body-weight varies in the newly born of these three animal species, thus :

	CALF.	DOG.	HUMAN BEING.
Ratio of weight of brain to body-weight	1 : 370	1 : 30	1 : 7
Ratio of lecithin to total proteid in the milk	1 : 71	1 : 47	1 : 33

With Bunge's characteristic style, he concludes that nature has here adapted the composition of the milk to the requirements of the young.

Loewi⁴ has continued his investigations on the **metabolism of the nucleins**. The nucleins of the food are split up in part in the intestine, the phosphoric acid being eliminated with the feces while the proteid residue is absorbed. The greater part of the nuclein, however, is not split up, but is absorbed, and it is possible, by feeding nucleins, to get nitrogen and phosphoric acid retained in the body in the proportion

¹ Zeit. f. Heilk., 15, S. 1.

² Zeit. f. physiol. Chem., XXXII, S. 214.

³ Zeit. f. physiol. Chem., XXX, S. 495.

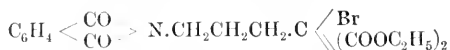
⁴ Arch. f. exper. Path. u. Pharm., XLV, S. 157.

in which they occur in the nuclein. Under normal conditions the elimination of uric acid is directly dependent upon the nature of the food.

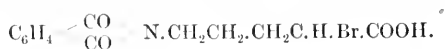
Conradi ¹ reports experiments on the **changes produced in milk by heating**. When a little calcium chlorid is added to milk and this is heated to from 45° to 65° C., the milk is coagulated; if, however, the milk has been previously heated to 80° C., and allowed to cool, and then calcium chlorid added and the milk again heated, coagulation takes place at a much lower temperature. The explanation of this change is not known, but it indicates some change in the casein; hence the author thinks it advisable, in sterilizing milk, to avoid temperatures at which such changes are produced. The action of rennet on milk heated to 80° C. is retarded. A general account of the changes produced in milk by heat is given by Blackader. ²

Mucin.—Schepilewsky stated a year or two ago that mucin could be obtained from muscle. This work was repeated by Mendel and Goodman, ³ who reached the conclusion that the material assumed by Schepilewsky to be mucin was neither glucoproteid nor a nucleoproteid, but was a substance resembling the "stroma substance" of von Holmgren. The subject has been studied more recently by Fried and Gies, ⁴ who think that the substance in question is alkali albuminate, or at least contains alkali albuminate. The **ligamentum nuchæ** is found by Richards and Gies ⁵ to contain an appreciable quantity of mucin, having all the qualities of the glucoproteids separable from white fibrous connective tissue. These authors also discuss in this connection a new method for the preparation of elastin. The elastin prepared by the new method contains less sulphur than that obtained by the older methods.

Ornithin.—Owing to the close relation which exists between the three well-studied diamido-acids ornithin, lysin, and arginin to the proteids on the one hand and to α - δ -diamidovalerianic acid on the other, Emil Fischer ⁶ is led to undertake a synthesis of the latter. He starts with the diethyl ether of phthalimidopropylbrommalonic acid,



from which he prepares δ -phthalimido- α -bromvalerianic acid,



By treating this compound with ammonia, and splitting with hydrochloric acid, α - δ -diamidovalerianic acid is formed:



The substance, however, proved not to be ornithin, but the racemic form of the acid, a result perfectly analogous to that obtained by Gabriel and

¹ Münch. med. Woch., XLVIII, S. 175.

³ Am. Jour. of Physiol., IV, p. 260.

⁵ *Ibid.*, V, p. xi.

² N. Y. Med. Jour., LXXIII, p. 183.

⁴ *Ibid.*, V, p. x.

⁶ Ber. d. deut. chem. Gesell., 34, S. 454.

Maass,¹ who obtained the racemic form of lysin from phthalimido-butylmalonic ether.

The subject of **oxaluria** has been studied experimentally by Baldwin.² After giving a description of the methods used, the author takes up the vexed question of the origin and significance of the oxalic acid found in the urine, and reaches the conclusion that it is derived entirely, or almost entirely, from that of the food. When a patient is placed upon a diet free from oxalates, the oxalic acid disappears from the urine, or is present in too small quantities to be of any importance. In certain abnormal conditions the oxalic acid is formed in the organism. This formation is connected with fermentative activity in the alimentary canal. Thus, prolonged feeding with excessive amounts of glucose (along with meat) leads to oxaluria. This oxaluria is associated with a mucous gastritis and with absence of free HCl in the gastric contents. The oxaluria and gastritis are due to fermentation induced by excessive feeding with sugar, and the oxalic acid is formed in the gastric contents. The author thinks that the symptoms attributed to an oxalic acid diathesis (with the exception of those due to local irritation in the genitourinary tract) are not due to the presence in the system of soluble oxalates, but probably depend upon other products of fermentation and putrefaction.

Protagon.—Wörner and Thierfelder³ endeavored to prepare a pure specimen of protagon for the purpose of investigating the cerebrosid which this substance has been assumed to yield on decomposition. They extracted the brain matter with 80% alcohol, at temperatures not exceeding 50°, and obtained a preparation consisting of rosettes of united needles, whose crystalline appearance suffered no change upon repeated crystallization, provided that the temperature of the alcohol from which the crystals were deposited was not allowed to rise above 50°. In spite of this uniformity of crystalline appearance, different preparations varied as much as 6.5% in their carbon percentage—a variation which had already been encountered by Kossel and Freytag,⁴ who attributed it to the existence of different protagons in the brain. Wörner and Thierfelder, however, show that by fractional crystallization from various mixtures of ethyl alcohol, methyl alcohol, chloroform, and benzene, it is possible to separate protagon into at least three different substances. While they were careful that none of their solutions reached a temperature of 50°, they regard this precaution as superfluous, taking the ground that the supposed decomposition products of protagon, at temperatures slightly exceeding 50°, really exist as such in the brain. One of these three substances they claim to have obtained in comparative purity and call it cerebron. It is a snow white powder, free from phosphorus and sulphur, and dissolves freely in water without previous swelling. It separates from a mixture of benzene and alcohol, in a form that is characteristic, but not crystalline. When suspended in 85% alcohol for an hour at 50°, the substance undergoes a curious

¹ Ber. d. deut. chem. Gesell., 32, S. 1266.

² Jour. of Exper. Med., v, p. 27.

³ Zeit. f. physiol. Chem., xxx, S. 542.

⁴ Zeit. f. physiol. Chem., xvii, S. 431.

atomic rearrangement, and changes into a mass of crystalline plates not unlike cholesterin in appearance. Eight preparations show a uniform composition in carbon and hydrogen, but the nitrogen varies considerably. By boiling for a short time with dilute hydrochloric acid cerebrin undergoes an easy hydrolysis, splitting off a reducing carbohydrate. This carbohydrate yields mucic acid on oxidation with nitric acid, and when treated with phenylhydrazin forms an osazone which melts at 193° . (Galactosazone melts at 190° .)

In previous volumes of the YEAR-BOOK an account has been given of a group of **basic substances called protamins**, which Kossel and his coworkers have obtained from the spermatozoa of various fishes. These substances yield on hydrolysis the hexone bases lysin, histidin, and arginin, but no tyrosin, leucin, nor any monamido-acid, so that they represent a pure form of the hexone group which is now known to exist in the molecule of every proteid. Kurajeff¹ now adds three members to this most interesting class of substances. Two of these he finds in the ripe testicle of the shad and the pike; and the third, which he has submitted to a close chemie examination, was obtained from the spermatozoa of *Acipenser stellatus*. Aqueous solutions of this protamin are capable of precipitating ordinary proteid solutions and respond beautifully to the biuret test, but are not affected by Millon's reagent. On the other hand, the substance differs from the true protamins, since its aqueous solution is acid to litmus. From an analysis of its sulphate the composition of the substance was found to be in accord with the formula $C_{35}H_{72}N_{18}O_9$. In composition and in general chemie behavior the substance is very closely related to sturin, the protamin obtained from the testicle of the sturgeon. According to Kossel, the unripe testicle of all kinds of fishes contains a histon which is probably in combination with nucleic acid. In certain species, as the salmon, herring, sturgeon, and mackerel, the process of ripening involves the transformation of the histon into protamin, while in other species this transformation occurs to a very slight extent or not at all, and the histon is therefore to be found in both the ripe and the unripe testicle. This is especially true of *Lota vulgaris*, a very common Finland fish. Ehrstrom² finds that the ripe testicle of this fish contains no protamin, but a substance of pronounced basic properties, the distribution of whose basic nitrogen shows that it belongs to the general class of histons. The substance nevertheless fails to respond to two of the five reactions which Bang³ describes as characterizing the histons; *i. e.*, it is precipitated neither by nitric acid nor by boiling in very dilute salt solution. The substance also gives the furfural reaction, which is not produced by thymus histon, globin, or scombrin.

The proteids of diphtheria antitoxic serum do not show, according to Atkinson,⁴ any determinable differences chemically from those of normal serum. The diphtherie antitoxic power of both normal

¹ Zeit. f. physiol. Chem., XXXII, S. 197.

² Zeit. f. physiol. Chem., XXXII, S. 350.

³ Zeit. f. physiol. Chem., XXVII, S. 463.

⁴ Jour. of Exper. Med., v, p. 67.

and immunized serum is carried by the globulin and its fractional precipitates. When the globulin is precipitated, the antitoxin is also precipitated. Hence it is thought that diphtheria antitoxin is a form of globulin.

Aloy has found that in many tissues with an active metabolism the **ratio of the calcium to the magnesium** is less than 1, whereas in tissues whose functions are largely mechanical (bone, etc.) the ratio is greater than 1. Ribaut¹ finds that this law does not hold for the spleen. In this organ the calcium is more abundant than the magnesium, in both the pulp and the connective-tissue meshwork, although the magnesium is more abundant in the pulp than in the meshwork.

Biologic Test for Egg-albumen.—Uhlenhuth² finds that by injecting egg-albumen into the peritoneal cavity of a rabbit the serum of the latter acquires the property of forming a precipitate with solutions of egg-albumen. The serum of normal rabbits does not have this property. One part of egg-albumen in 100,000 can be detected in this manner. The ordinary chemie reagents cause precipitates only when the solution contains at least 1 part in 1000. The serum of such rabbits causes no precipitate with any of the ordinary albumins. It does cause a precipitate with the albumen of the pigeon's egg, and hence is not strictly specific for egg-albumen. When the egg-albumen is administered to the rabbit by the stomach, the same change is caused in the serum, but it occurs more slowly and is not so marked. This property of the serum is not destroyed by heating to 60° for an hour. Similar results have been obtained by Myers³ with various other proteids. Working along similar lines, Uhlenhuth⁴ has succeeded in obtaining serums which give **specific reactions for human or other blood**. To prepare the serum for testing for the blood of man, rabbits were given a number of injections of defibrinated human blood. The serum of such rabbits gave a distinct turbidity when mixed with human blood, but remained clear when added to blood of other species. A very small specimen of dried blood is sufficient for the test. Wassermann and Schütze⁵ published entirely similar results almost simultaneously with Uhlenhuth. These authors tested 24 kinds of blood. Only human blood and that of the monkey gave the reaction, and the reaction of the monkey's blood was feeble in comparison with that of the human blood. The reaction could be obtained with serum 14 days old. The importance of these results from the medicolegal standpoint is obvious. Mertens⁶ shows that the serum of a young rabbit born after the mother had been prepared with the preliminary injections gave the specific reaction just as the serum of the mother did. Mertens also shows that nephritic urine produces a cloudiness with the serum of these rabbits. This is considered proof that the albumin in the urine in these conditions is derived from the blood.

¹ Compt. Rend. de la Soc. de Biol., LII, p. 991.

² Deut. med. Woch., XXVI, S. 734.

³ Centralbl. f. Bakt., XXVIII, S. 237.

⁴ Deut. med. Woch., XXVI, S. 82.

⁵ Berlin. klin. Woch., XXXVIII, S. 187.

⁶ Deut. med. Woch., XXVII, S. 161.

Neurotoxic Serum.—The serum of a normal rabbit is not toxic to a dog when injected into the latter. Enriquez and Sicard¹ find, however, that the rabbit's serum becomes toxic after the intraperitoneal injection into the rabbit of extracts of the brain of the dog. The dogs die with marked symptoms of cerebral stimulation. Epileptiform convulsions may occur. These experiments show that it is possible to produce neurotoxins in the serum of the rabbit by the intraperitoneal injection of nervous tissue from other species. The result is obtained with difficulty, however, and the toxicity of the serum obtained is not very great.

Sugar.—A new phenylhydrazin test for sugar is described by Riegler.² One-tenth gram of phenylhydrazin hydrochlorid is placed in a small porcelain evaporating dish, 0.5 gram of sodium acetate is added, and then 20 drops of the sugar solution or urine. The mixture is heated to boiling and from 20 to 30 drops of a 10% solution of caustic soda is added. If as much as 0.005% of sugar is present, the solution becomes reddish-violet. The violet color must appear in less than a minute to denote a pathologic amount of sugar. Another modification of the phenylhydrazin test which is well adapted to clinical work is proposed by Willson.³ Equal parts of sodium acetate and phenylhydrazin hydrochlorid ($\frac{1}{2}$ inch of each in an ordinary test-tube) are boiled with the urine in a water-bath (or ordinary beaker) for from 5 to 10 minutes. A drop of this, placed directly upon a slide and examined with a low power of the microscope, shows the characteristic crystals in $\frac{1}{2}$ to 2 minutes. Margulies⁴ has made a thorough clinical study of Neumann's phenylhydrazin test, comparing the results obtained by it with those obtained by Nylander's and Trommer's tests and by the polariscope. The author confirms all the statements made by Neumann. Five one-hundredths per cent. of sugar can be detected by it with absolute certainty, while in many cases 0.02% can be detected. **Nitropropiol Test for Sugar:** Nitropropiol tablets consist of orthonitrophenylpropionic acid and sodium carbonate. On warming these tablets in solutions containing sugar, oxygen is given off (by which the sugar is oxidized) and indigo blue is formed. Gebhardt⁵ finds these tablets very valuable in testing for sugar in the urine. The reaction is sensitive, easily carried out, and is not influenced by the presence in the urine of such bodies as bile-pigments, blood, phosphates, or small amounts of albumin. The urine of patients who have taken various drugs (benzoic acid, chloralhydrate, carbolic acid, iodine, senna, etc.) does not give the reaction unless glucose is present. The test does not seem to be adapted to quantitative work.

Pavy and Sian⁶ find that the reducing action of the sugar of the blood on alkaline solutions of metallic salts is considerably increased by inversion, which could not be the case if the only sugar of

¹ Compt. Rend. de la Soc. de Biol., LII, p. 905.

² Deut. med. Woch., XXVII, S. 40.

³ Phila. Med. Jour., VII, p. 624.

⁴ Berlin. klin. Woch., XXXVII, S. 881.

⁵ Münch. med. Woch., XLVIII, S. 24.

⁶ Jour. of Physiol., XXVI, p. 282.

the blood were dextrose. From an extract of horse's blood with methyl alcohol they prepare phenylhydrazin compounds, and by fractional crystallization of these are successful in isolating an osazone which melts at 157° . This osazone is freely soluble in hot water, crystallizing, when the solution cools, in spheric aggregates of needles. The melting-point of this osazone is evidence that the sugar is isomaltose, and the method of isolation is such that it could not result from glycogen. The discovery of isomaltose in the blood has additional interest in the light of Baisch's ¹ discovery that the carbohydrate of normal urine is not alone glucose, but that a carbohydrate is also present which forms an osazone freely soluble in hot water and melting at 153° . Baisch regarded the sugar as identical with Fischer's isomaltose. More recently Rosin ² and Alfthan ³ report that isomaltose is also to be found in diabetic urine. Saito and Katsuyama ⁴ make an examination of the sugar in hen's blood, and conclude, from a study of the osazone, of fermentation with yeast, and of the optical properties, that the sugar is no other than d-glucose. They say nothing about isomaltose, but find that the reduction with Fehling's solution is quantitatively in accordance with the optical rotation for glucose, which could not be the case if any appreciable amount of isomaltose were present. Neuberg ⁵ evaporated 20 liters in a vacuum, and after precipitating the salts with alcohol, prepared and purified a hydrazone which crystallizes in fine needles and prisms and possesses all the characteristics of the hydrazone from inactive racemic arabinose.

Suprarenal.—There is probably no substance which is more interesting at the present time to the physician than the physiologically active constituent of the suprarenal gland. It will be remembered that von Fürth ⁶ isolated the substance by means of its lead compound, and from a series of somewhat discordant analyses concluded that the compound is a hydrodioxy pyridin whose composition is represented by one of the two formulas $C_5H_7NO_2$ and $C_5H_9NO_2$. On the other hand, Abel ⁷ treated an aqueous extract of the gland with benzoyl chlorid and caustic soda, saponified the benzoyl compound with very dilute sulphuric acid in the autoclave, and prepared a series of derivatives whose analyses all led to the same formula for the active principle, $C_{17}H_{15}NO_4$. In a later paper von Fürth ⁸ notes that his preparation, which he names "suprarenin," is not identical with Abel's "epinephrin." He prepares epinephrin by precipitation of an extract of the gland with an ammoniacal lead solution, and finally throws out the epinephrin by the careful addition of ammonia. This is not the method which Abel describes for the preparation of epinephrin; nevertheless, von Fürth makes the following comparison of the two substances:

¹ Zeit. f. physiol. Chem., XX, S. 248.

² Deut. med. Woch., XXVI, S. 497.

³ Deut. med. Woch., XXVI, S. 499.

⁴ Zeit. f. physiol. Chem., XXXII, S. 231.

⁵ Ber. d. deut. chem. Gesell., 33, S. 2243.

⁶ Zeit. f. physiol. Chem., XXVI, S. 15.

⁷ Zeit. f. physiol. Chem., XXVIII, S. 318.

⁸ Zeit. f. physiol. Chem., XXIX, S. 105.

	EPINEPHRIN.	SUPRARENIN.
In water	Difficultly soluble.	Easily soluble.
With ammonia	A brown flocculent precipitate.	No precipitate.
With ferric chlorid	No color.	Green color in acid solution, red in alkaline.
With silver nitrate and ammonia	No reduction.	Strong reduction.
With Mandelin's reagent	No color.	Transient reddish-violet.
With melted alkalis	Odor of skatol.	No odor of skatol.
With picric acid	Yellow precipitate.	No precipitate.
With phosphotungstic acid, Mayer's reagent, concentrated zinc chlorid, and tannic acid	White precipitates.	No precipitates.

He also prepared a specimen of epinephrin from the benzoyl compound, by a method somewhat resembling the one which Abel describes, and verifies Abel's claim that under these conditions there is present a substance which is copiously precipitated from its solution in dilute acids, by the careful addition of ammonia. From this autoclave product he can obtain only a small quantity of an inactive pierate, and shows that the filtrate from this pierate is powerfully active. This is also true in cases in which he employs a solution of the active principle, obtained by means of its lead compound, and in which he has submitted the material neither to the action of benzoyl chlorid nor to the action of pressure in the autoclave. Here, however, there was a copious yield of inactive pierate. Von Fürth also prepared an iron compound of suprarenin by the addition of iron chlorid and ammonia to a solution of the substance in acidified methyl alcohol, and found this iron compound possessed of remarkable physiologic activity. He therefore concludes that the active principle of the gland forms an iron compound difficultly soluble in methyl alcohol, but no pierate difficultly soluble in water; and as Abel's epinephrin does not conform to either of these two conditions, its active salts can owe their activity only to contamination with the active principle. Abel¹ takes the ground that the differences which von Fürth has noted between epinephrin and suprarenin are due entirely to differences in the method of preparation, and that what von Fürth calls suprarenin is native or unaltered epinephrin. He shows that epinephrin, the chromogenic substance of the suprarenal gland, no matter by what method it is prepared, becomes precipitable by ammonia whenever it is submitted to hydrolysis. Thus the iron compound of suprarenin was prepared according to von Fürth's method. From this iron compound, which von Fürth claims contains the blood-pressure-raising substance, was prepared a benzoyl and an acetyl derivative, both of which, on hydrolysis, gave solutions from which flocculent, inactive epinephrin could be precipitated with ammonia. Abel also shows that by simply heating the filtrate from the iron

¹ Johns Hopkins Hosp. Bull., XII, Mar., 1901.

compound, without previously benzoating, a substance results which is precipitable by ammonia and which possesses all the properties hitherto ascribed to epinephrin. In order to meet the statement of von Fürth that the activity of the salts of epinephrin is due solely to a trace of suprarenin which is present as an impurity, Abel shows that his epinephrin bisulphate can be quantitatively transformed into flocculent, inactive epinephrin. As a further proof that inactive epinephrin is a near chemic relative of the active substance of the gland, Abel describes experiments which he has made with an extremely active preparation which Takamine has lately placed upon the market. (See below.) This preparation also fails to yield a precipitate with ammonia, but does so after it has been submitted to hydrolysis under pressure. Von Fürth originally took the position that the active principle of the gland is a substance of the formula $C_5H_7NO_2$ or $C_5H_9NO_2$. As already stated, this conclusion rests upon analytic data that are remarkably discordant. In his later work he makes no attempt to strengthen his position upon this point, but directs his efforts mainly to the proof that the active principle and the substance which forms the green iron compound are the same; that Abel's epinephrin is different from his own suprarenin; and that epinephrin has no connection whatever with the active substance of the gland. In the first two of these assumptions he is undoubtedly correct (granting, of course, that von Fürth has sufficiently defined "suprarenin"). In the last, Abel shows him to be grossly in error, by the following experiment: From 1.197 grams of epinephrin bisulphate 0.9242 gram of the green iron was prepared. If, therefore, the formation of the iron compound can be due only to the presence of the active principle, and if the activity of the bisulphate is due only to contamination, the bisulphate must be contaminated with at least 75% of the active principle even when large, unavoidable losses in manipulating the iron compound are entirely neglected. Abel also shows that by benzoating and subsequent hydrolysis his entire series of epinephrin derivatives can be prepared from von Fürth's iron compound. Takamine¹ describes a preparation which he has obtained from the suprarenal gland and which, owing to the differences of opinion which exist between Abel and von Fürth, he prefers to call by still a third name, "adrenalin." He does not announce his method of preparation, but states that it is entirely different from any of the methods which have been described. His product is a white microcrystalline powder, which may assume any one of five introconvertible forms, according to the conditions under which crystallization occurs. When perfectly dry, the substance is stable. It shows an alkaline reaction toward litmus and phenolphthalein, has a slightly bitter taste, and leaves a numbed feeling on the tongue. The substance is difficultly soluble in water, but easily soluble in very dilute acids, giving solutions which do not form precipitates with the alkaloidal reagents. Neutral solutions, even in great dilution, reduce salts of silver and gold, and produce the well-known green color with ferric chlorid. The physiologic activity of this prepa-

¹ Therap. Gaz., Apr., 1901.

ration is remarkable. A fraction of 1 drop of a solution of 1 part of the substance in 10,000 parts of water blanches the normal conjunctiva within a minute, while the intravenous injection of 0.000016 gram in the form of the chlorid increased the pressure of a dog weighing 30 pounds nearly 9 millimeters of mercury.

Reichert¹ makes an interesting study of the action of **adrenalin in connection with morphin**, and offers some suggestions as to the possible use of the drug in cases of morphin-poisoning. He finds that while doses of 0.00025 gram of adrenalin per kilo of body-weight are without noticeable effect upon either metabolism or body-temperature, such doses in the case of morphinized dogs are sufficient to prevent the remarkable changes which would otherwise be caused by the morphin. He offers the explanation that morphin acts as a depressant to the processes of secretion of the adrenal glands, thus depriving the vital centers of the active principle of the secretion, with the consequent depression of metabolism. In normal dogs the small dose is insufficient for any marked physiologic effect, because the vital centers are already supplied with a quantity of the active principle which suffices for all purposes, and any slight increase in this amount is either quickly destroyed or is compensated by an inhibition of the secretion. This explanation is supported by Reichert's observation that larger doses of adrenalin (0.001 gram per kilo) have the same effect on normal dogs as the smaller doses on morphinized dogs; for after the use of the larger quantity of the drug, its amount is in excess of what can be destroyed or compensated, and the results are those which would be caused by a hypernormal activity of the gland.

Thymin.—When we consider the large number of nucleic acids that have been found to yield a pyrimidin derivative as one of their hydrolytic products, and add the negative evidence that the literature records not a single instance of failure to find such a derivative when a search has been made, it seems almost certain that the pyrimidin ring plays an important part in the chemie structure of every animal and plant cell. Kossel and Neumann² discovered thymin among the hydrolytic products of thymus nucleic acid, and afterward showed that the compound also results from the hydrolysis of the nucleic acid of the spleen. In like manner Miescher³ obtained a crystalline substance from salmon nucleic acid, which Schmiedeberg failed to recognize, but which is now known to be identical with the thymin of Kossel and Neumann. Thymin has also been obtained by Kossel from the nucleic acid of the spermatozoa of the sturgeon, and by Gulewitsch⁴ from the nucleic acid of herring testicle. Aescoli⁵ studied the hydrolytic products of the nucleic acid contained in the yeast cell, using a very simple and convenient method which has lately been proposed by Jones.⁶ Curiously enough, he finds no thymin, but a crystalline compound having the for-

¹ Univ. of Penna. Med. Bull., Apr., 1901.

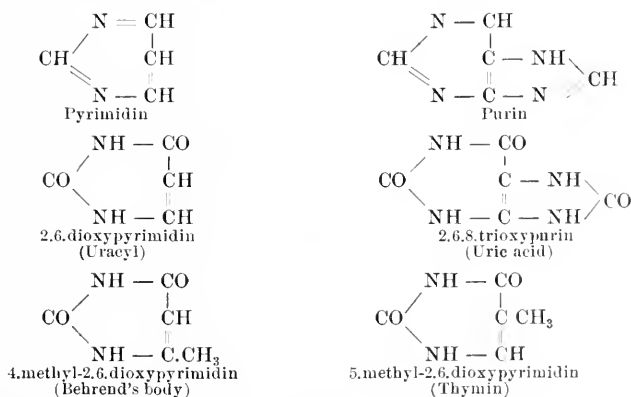
² Ber. d. deut. chem. Gesell., 27, S. 2217.

³ See Schmiedeberg, Arch. f. exper. Path. u. Pharm., 37, S. 124.

⁴ Zeit. f. physiol. Chem., XXVII, S. 180 u. 293.

⁵ Zeit. f. physiol. Chem., XXXI, S. 161. ⁶ Zeit. f. physiol. Chem., XXIX, S. 461.

mula $C_4H_4N_2O_2$, which is one of the dioxypyrimidins and apparently the one of which thymine is the methyl derivative. Steudel¹ finds that by treatment with a mixture of fuming nitric and concentrated sulphuric acids thymine is oxidized to a compound which can be crystallized out of ammonia, and is represented by the formula $C_4H_4N_4O_3$. By reducing this compound with nascent hydrogen a crystalline base is obtained which yields an intense alloxan reaction with chlorine water and ammonia.² If further evidence is needed to show that this compound is a pyrimidin derivative, it is furnished by Steudel's discovery of urea as a result of the oxidation of thymine with barium permanganate. By treatment with chlorine two hydroxyl groups are replaced, forming dichlorothymine, $C_4H_2N_2Cl_2$. Steudel³ claims that such a substitution is impossible unless each of the two oxygen atoms of thymine is in combination with a carbon atom whose neighboring carbon atom is in combination with hydrogen. Thymine must therefore be either 5-methyl-2,6-dioxypyrimidin or 4-methyl-2,6-dioxypyrimidin. Behrend⁴ had already prepared synthetically a methyl dioxypyrimidin and had shown that the groups occupy the positions 4-2-6. Steudel had therefore only to show that thymine is not identical with Behrend's compound in order to definitely establish its constitution. By treatment of thymine with hot concentrated caustic potash he obtained its potassium salt, which with methyl iodide yields dimethylthymine.² The latter substance melts at a temperature which is different from the melting-point of Behrend's trimethyl uracyl by 40°. That thymine and methyl uracyl are not identical had already been sufficiently shown by Jones.⁵ By the action of bromine on thymine he obtained a beautifully crystalline dibrom substitution product containing a molecule of water of crystallization, $C_5H_5N_2O_2Br \cdot H_2O$, while the corresponding derivative of methyl uracyl is anhydrous.⁶ The reactions which have been referred to, as well as the relation which uric acid bears to the substances under discussion, can easily be understood by reference to the following structural formulas:



¹ Zeit. f. physiol. Chem., XXXII, S. 241. ² Zeit. f. physiol. Chem., XXX, S. 539.

³ Kossel and Steudel, Zeit. f. physiol. Chem., XXIX, S. 303.

⁴ Liebig's Annalen, 229, S. 8.

⁵ Zeit. f. physiol. Chem., XXIX, S. 20.

⁶ Liebig's Annalen, 229, S. 17, u. 231, S. 249.

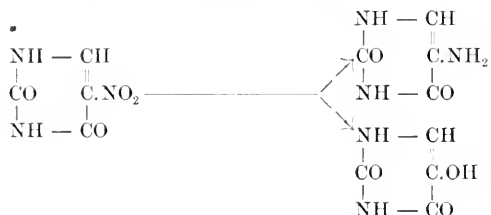
On account of their near relation to uric acid it is naturally of interest to know how the pyrimidin derivatives behave in the organism. Having found that methyl uracyl passes the animal body unaltered while thymine gives rise to urea in the urine,¹ Stendel² proceeds with an examination of the compounds which take part in Behrend and Roosen's³ synthesis of uric acid. This synthesis was accomplished as follows: Acetoacetic ether was condensed with urea to form β -uramido-crotonic ether:



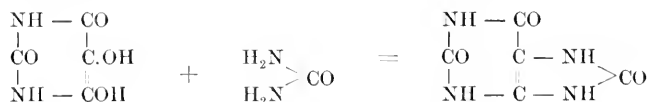
By saponification, the corresponding acid is formed which passes spontaneously into its anhydrid, methyl uracyl. This, upon oxidation with nitric acid, forms nitrouracylearmonic acid:



By heating this acid and reducing the nitrouracyl so formed, both amidouracyl and isobarbituric acid were obtained.



The latter substance yields isodialuric acid upon oxidation with bromine; and by condensation with urea this compound forms uric acid:



After feeding dogs with methyl uracyl Stendel found the substance unaltered in the urine and was able to prove the entire absence of all the members of this series. Nitrouracylearmonic acid seems to be completely oxidized, since it does not appear in the urine itself nor does it give rise to any member of the series. Nitrouracyl appears unaltered in the urine. Isobarbituric acid and isodialuric acid do not appear in the urine nor do they give rise to any difficultly soluble condensation product with urea. The same is true of thymine and 2.6.dioxyypyrimidin

¹ Sitzungsber. d. Gesell. z. Beford. d. gesamt. Naturwissensch. z. Marburg, Jan., 1901.

² Zeit. f. physiol. Chem., XXXII, S. 285.

³ Liebig's Annalen, 251, S. 235.

obtained from yeast nucleic acid. The difference in the organism between thymine and methyl uracyl is remarkable when it is noted that the only chemie difference between the two compounds is in the position of the methyl group. 2,4,diamido-6-oxypyrimidine and 2,4,5,tri-amido-6-oxypyrimidine were found to be toxic, causing serious disturbances in metabolism and giving rise to proteid in the urine. Thus the introduction of amido groups into the pyrimidine ring causes harmless substances to become poisonous—a discovery which sufficiently explains the poisonous properties of adenine.

Mairet and Ardin-Delteil¹ have investigated the question of the **toxicity of the sweat** of normal man and find that there are no poisonous substances in it; rabbits survive the intravenous injection of 116 to 361 cc. per kilo of their body-weight. In other experiments² rabbits were killed by such injections, but death resulted from the low osmotic pressure of the sweat. Ardin-Delteil³ has also investigated the freezing-point of the sweat. He found that in 15 experiments the average was 0.237° , but that it varied from 0.08° to 0.46° . These variations were due largely to the variations in the amount of sodium chloride. These authors have also studied the **toxicity of the sweat of epileptics**⁴ and of **general paralytics**.⁵ The sweat collected in the intervals between epileptic attacks was not toxic, while that collected during or immediately after an attack was found to be feebly toxic; the toxicity became less the longer the interval after an attack. The sweat of general paralytics was also found to be feebly toxic. Its action upon rabbits differed from that of the sweat of healthy men chiefly in that it caused an acceleration of the heart, and that the effect upon the nervous system was more marked; some symptoms of paralysis were produced.

Urea from Proteids.—It has been very generally believed that the urea of the urine is partly a result of the simple hydrolysis of the proteids, but that it owes its origin principally to a combined oxidation and splitting. Chemists have continually attempted to imitate these two processes in the laboratory. The former was successfully carried out by Drechsel, Hedin, Kossel, and others, whose combined efforts show that arginine is a constant hydrolytic product of the proteids, and that arginine can be made to yield urea by simple hydrolysis without oxidation. While this work is sufficiently important to constitute a landmark in the science, it deals with only a very small fractional part of the nitrogen which is metabolized in the body. The second of the two processes referred to has been most successfully accomplished by Jolles,⁶ who makes one of the most important contributions of the year. By boiling various proteids with sulphuric acid and potassium permanganate he produces a set of conditions under which the proteids may be split or oxidized, but under which neither urea nor the hexone bases

¹ Compt. Rend. de la Soc. de Biol., LII, p. 982.

² Compt. Rend. de l'Acad. de Sci., CXXXI, p. 844.

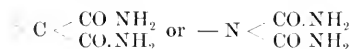
³ Compt. Rend. de la Soc. de Biol., LII, p. 1046.

⁶ Zeit. f. physiol. Chem., XXXII, S. 361.

² *Ibid.*, p. 1013.

⁵ *Ibid.*, p. 1107.

would suffer any alteration if formed. He then examines the products of oxidation with special reference to 3 classes of substances, and characterizes the proteids by the relative quantities of these 3 kinds of nitrogenous products which they yield: (I) Urea; (II) substances precipitable by phosphotungstic acid, among which the hexone bases were shown; (III) substances not capable of precipitation with phosphotungstic acid, whose nitrogen is referred to as filtrate nitrogen. Here one might expect to find large quantities of ammonia, but, strangely enough, Jolles was able to show the presence of this compound only in the merest traces. The nitrogen of blood fibrin and plant vitellin is about equally divided among these 3 classes. From 71 % to 80 % of the nitrogen of crystallized egg-albumen, crystallized serum-albumin, crystallized serum-globulin, casein, and vitellin from the egg yolk gives rise to urea; while oxyhemoglobin contains 90 % of its nitrogen in such a form as will produce urea by contemporaneous oxidation and splitting. Recognizing the importance of showing that the substance with which he is dealing is really urea, Jolles prepared the oxalate, analyzed it, and afterward identified the urea prepared from the oxalate. Jolles' failure to find ammonia proves that, contrary to the results of Hofmeister's researches,¹ the formation of urea is not necessarily connected with the formation of ammonia. Jolles offers the opinion that the proteids suffer simultaneous oxidation and splitting in the animal body. It has been pointed out that the biuret reaction, which is given by all proteids and protamins, is produced also by any chemie compound which contains the group



so that one or both of these groups are probably responsible for the reaction in the case of the proteids. Jolles attributes the formation of urea to the presence of similar groups, and judging from the relatively large quantity of urea which is produced by oxyhemoglobin, this proteid must contain a large number of such groups.

Great variations in the daily excretion of urea were noted by Leven² in some observations upon children. Some of the children were kept in bed, while others were allowed to play in the room. The diet was simple and remained the same during the observations; yet the amount of urea excreted during one day was sometimes double that excreted on the following day. Similar variations in the total quantity of urine, of the total nitrogen, and of the chlorids were observed.

¹ Arch. f. exper. Path. u. Pharm., XXXVII, S. 426.

² Compt. Rend. de la Soc. de Biol., LII, p. 948.

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